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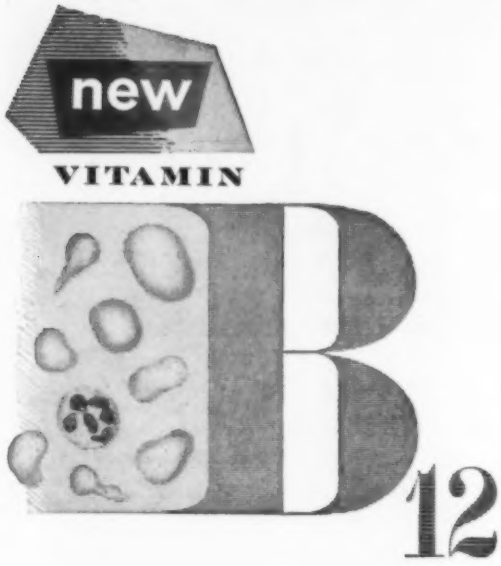

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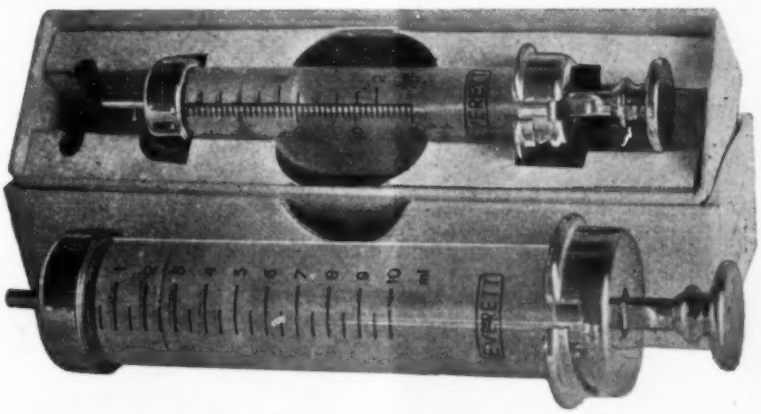

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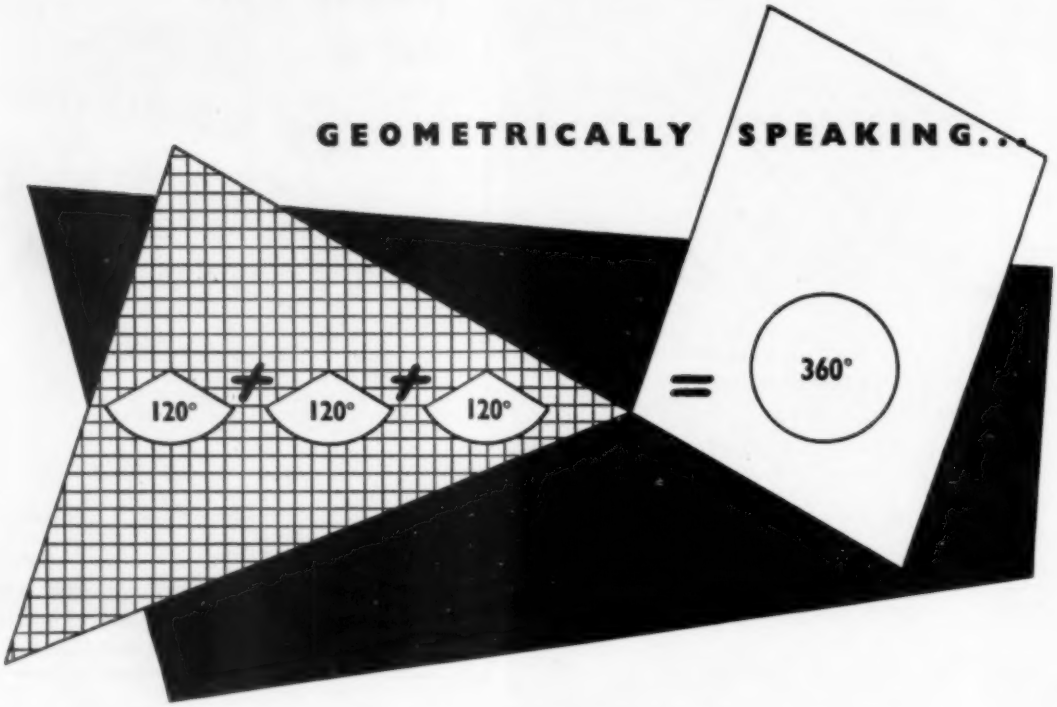

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Ref: Schweinburg and Rutenburg Proc. Soc. Exper. Biol. & Med 1952. Page 482.

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CONTROLLED HYPOTENSION IN FENESTRATION OPERATIONS

EXPERIENCES IN TWENTY-SEVEN CASES

J. FINE, M.B., B.CH., D.L.O., F.R.C.S.E., H. BENTEL, M.B., B.CH.

AND

L. MEYEROVITZ, M.B., B.CH.

Johannesburg

The idea of lowering the blood pressure to produce a bloodless field for operation in fenestration is not a new one.

I. S. Hall of Edinburgh using high spinal anaesthesia states that 'The majority of surgeons experienced in this operation have agreed that the essentials for success are haemostasis . . . .' When the pressure has fallen the operator enjoys a facility and continuity of work which has to be experienced to be believed.[1] Griffiths and Gillies of Edinburgh have stated that ischaemia can be obtained from controlled hypotension without sacrificing the safety factor.

Controlled hypotension gives us an operation field in which the tissues resemble the bloodless field seen in orthopaedic surgery. A fenestra free from blood can be obtained, while troublesome oozing has ceased. Korkis has confirmed these findings in 15 fenestrations.[2] He adds that hypotension allows the performance of better surgery when the operation involves work in small, deep and dark cavities.

With this introduction we wish to present our experience of hypotension in 27 cases of fenestration.

METHOD

In all cases hexamethonium bromide aided by procaine amide was used to produce the hypotension. Hexamethonium bromide paralyses the autonomic ganglia and produces a fall in blood pressure, to which we add postural changes to achieve an optimum dry operating field. Ischaemia is readily produced when the systolic pressure is lowered to 55-65 mm. Hg [3] and maintained for a limited period of one hour.

According to the abundant literature on hypotension the dangers confronting us are: (*a*) Excessive fall of blood pressure with irreversible circulatory failure, (*b*) cerebral and coronary thrombosis, (*c*) renal failure, (*d*) liver necrosis, (*e*) blindness, and (*f*) reactionary haemorrhage.

We have excercised great care in our limited number of cases and having had a fairly wide experience of hypotension on other cases and realizing that a good general anaesthetic with full oxygenation is essential to the success of the operation [4] we have managed to avoid any complications.

The details of the routine employed by us are:

(*a*) Examination of the patient by the anaesthetist the previous day as regards suitability for controlled hypotension.

(*b*) Induction by the usual method and intubation in all cases to ensure a perfect airway.

The bleeding in the soft-tissue surgery is managed in the usual way by ligation and cautery, anaesthesia being maintained at this time by gas and oxygen, and pethidine and/or 'trilene'.

The bone surgery is followed as usual by the exposure of the labyrinth for fenestration. The drilling of the fenestra is then proceeded with until the blue oval with the central 'cap' is prepared.

Ten minutes before the uncapping of the fenestra, i.e. the moment when minimal bleeding is imperative, hypotension is induced by the anaesthetist. At this stage anaesthesia is maintained with 100% oxygen and ether. The systolic pressure is reduced to 60 mm. Hg and the effect is first observed by the operator and anaesthetist. With systolic pressure of about 80 results are not very

satisfactory. The pressure is further reduced by tilting the table in 'reverse Trendelenberg'. The new angles which are created for the operator are awkward at first, but he soon becomes accustomed to working under these conditions.

When the bloodless field has been achieved the fenestra is made with great care. This takes about 30 to 40 minutes. After this the meatal flap is applied to cover the fenestra and it is packed down with cellophane-covered sponges. There is no oozing from the flap and the notoriously troublesome bleeders from the region of the facial canal come under control. Pressure is constantly maintained on the fenestra throughout the period of packing.

This concludes the hypotensive stage and the head is immediately lowered and all anaesthesia is stopped, the patient being maintained on oxygen alone. During the stage of hypotension very little anaesthetic is necessary to keep the patient adequately anaesthetized. The packing of the mastoid cavity and suturing of the endaural incision are then completed.

The immediate post-operative management of these cases requires specially-trained staff. Surveillance by the anaesthetist is also of necessity extended. We have been fortunate enough not to encounter complications or difficulties in our very small series and no doubt vigilance and complete co-operation of the whole team has contributed towards this.

The future may show that the end result of fenestration surgery has been favourably influenced and that this is a real advance in fenestration technique.[1]

We present in more detail some of our more interesting cases.

CASES

Case 1. Mr. V. H. G., aged 45 years, of normal build, weight 155 lb, and good general physical condition. Blood pressure 140/80 mm. Hg. The bleeding was moderate before hypotension. Fifty mg. hexamethonium bromide with 2 cc. procaine amide were given. The blood pressure was maintained at 50 mm. Hg systolic with posture. After retilting the patient at the end of the operation his blood pressure was 80 mm. Hg. Hypotensive result excellent.

Case 2. Mrs. B. B. A., aged 42 years, weight 140 lb, general physical condition good, with pre-operative blood pressure 130/80 mm. Hg. Before induction of hypotension there was little bleeding. However, we decided to induce hypotension because there were 3 arteriolar spurters in the bone. The patient was given a total of 45 mg. hexamethonium bromide and 1 cc. procaine amide. Blood pressure was maintained at 55 mm. Hg systolic. There was no further bleeding and the result was excellent.

Case 3. Mr. M. C., aged 33 years, weight 156 lb, general physical condition good. Pre-operative blood pressure 130/80 mm. Hg. Thirty mg. hexamethonium bromide was given and the blood pressure fell to 60 mm. Hg systolic. Despite this there was still a fair amount of oozing. After another injection of 15 mg. hexamethonium bromide the blood pressure settled at 50 mm. Hg systolic, and there was no further bleeding. The result was excellent.

Case 4. Miss J. M., aged 18 years, weight 110 lb, good general physical condition, with blood pressure 120/90 mm. Hg. There was very little bleeding throughout the operation in spite of a blood pressure of 110/90 mm. Hg. We postured this patient and with this alone, and no hexamethonium, achieved an excellent result.

Case 5. Mr. S. J., aged 35 years, weight 160 lb, of muscular build and good general physical condition. Pre-operative blood pressure 130/80 mm. Hg. The bleeding was fairly marked before induction of hypotension. Despite the injection of a total of 100 mg. hexamethonium bromide and 3 cc. of procaine amide the blood pressure stablised at 110/90 mm. Hg. The result, however, was excellent and in our opinion the reduced pulse pressure was responsible for this.

Case 6. Mr. C., aged 40 years, weight 172 lb, good general physical condition. Pre-operative blood pressure 130/80 mm. Hg. During the operation and before hypotension his blood pressure rose to 180/120 mm. Hg for no apparent reason. This patient was given a total of 250 mg. hexamethonium bromide and 2 cc. procaine amide. The blood pressure dropped to 110/96 mm. Hg but throughout the operation there was bleeding into the fenestra. This was our one failure.

SUMMARY AND CONCLUSIONS

This communication is based on a small series of 27 cases in which hypotension was induced by hexamethonium bromide, sometimes aided by procaine amide, to procure a bloodless field for fenestration. Ligation, cautery, etc., is used for the soft-tissue work and hypotension is induced only at the critical stage when the labyrinth is opened and the danger of bleeding into the fenestra exists. As soon as the flap is applied and the fenestra is sealed off, the hypotensive process is reversed. Posture is used as an important adjunct and teamwork is essential for success. The dangers of thrombosis, failure of function or damage of vital organs, and reactionary haemorrhage, must be appreciated.

In 26 cases (96%) we were able to procure a bloodless operative field. Only Case 6 was a failure (4%) and this indicates that in a certain small percentage of cases even large doses of hexamethonium bromide cause very little or no fall in blood pressure. There appears to be a dose which causes a maximal response, and beyond this increasing the dose produced little effect.

We are aware that there are many physiological questions which require explanation and we are proceeding with our investigations.

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3. Adriani, J. (1953): Ann. Otol., **62**, 423.
4. Enderby, E. H. Personal Communication to Bentel, H.

ABSTRACTS : UITTREKSELS

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Gegroepeer onder die hoof hiperkortisonisme kom 'n hele verskeidenheid kenmerke voor wat hoofsaaklik die gevolg is van die toediening van te groot dosisse oor te lank 'n tydperk. Voorbeelde hiervan is watergeswel, rusteloosheid, neerslagtigheid, hartverlamming, styging in die bloeddruk, terughouding van natrium, verhoogde afskeiding van kalium, hiperglisemie, huid- en ander manifestasies wat Cushing se *syndrome mendicamentosa* teweegbring. Die aktiwiteit van die voorste hipofise en van die bynierskors is geneig om gestuit te word gepaard met inwikkeling van die bynierskors en hiperskildklieraandoening kan ook voorkom.

Tydens 'n onlangse simposium by die *Mayo Clinic*[1] aangebied is verslag gedoen oor sekere probleme wat as gevolg van die kliniese gebruik van kortisoon ontstaan. Die aandag is bepaal op die moontlikheid van spysverteringstoornisse soos maagsere en hul komplikasies —bloeding en perforasie—tydens of na toediening van kortisoon en corticotrophin. Die gevolgtrekking is gemaak dat hierdie hormone 'n kousatiewe faktor mag wees, maar vanselfsprekend nie die enigste nie, daar baie van die pasiënte wat met hierdie middels behandel word nie sulke komplikasies toon nie.

Die sielkundige reaksies van die hormone is deur talle verslae behandel sedert die waarnemings van oorspronklike navorsers (Hench en andere) oor die dramatiese veranderinge in die ego-verhoudings wat deur hierdie middels veroorsaak word. 'n Hoë persentasie pasiënte aan wie kortisoon toegedien word ondervind verhewe gemoedstemmings wat somtyds baie opvallend is. Verandering in gemoedstemming kan die gevolg wees van die verligting van die kroniese en pynlike simptome van die siekte, maar dit is nie 'n volkome verduideliking nie omdat opvallende sielkundige reaksies ondervind word sonder dat enige liggaamlike veranderinge plaasvind terwyl sielkundige veranderinge somtyds bespeur word 'n hele rukkie voordat fisiologiese veranderinge deur die hormone teweeggebring word. 'n Verskeidenheid psigiatriese simptome kan deur pasiënte getoon word aan wie kortisoon toegedien word. Dit mag die gevolge wees van die interne steuring wat deur hierdie middels veroorsaak word. Sommige van die meer vanselfsprekende psigodinamiese aspekte val binne die bestek van homeostasis, integrasie en aanpassing.

EDITORIAL

DANGERS OF CORTISONE

The introduction of cortisone and hydrocortisone into therapeutics has received widespread publicity. Many of the actions and uses of these hormones are well known. They have been acclaimed for their virtues, but undesirable effects of their administration have also been recognized. Moreover, it can be said of them that 'one man's meat is another man's poison'.

A whole variety of features grouped under the heading of hypercortisonism can be produced, especially with overdosage and prolonged administration of the drugs. Amongst others there may occur oedema, restlessness, depression, cardiac failure, rise in blood pressure, retention of sodium, increased excretion of potassium, hyperglycaemia, skin manifestations and other features producing 'Cushing's syndrome medicamentosa'. Anterior pituitary activity and that of the adrenal cortex tend to be inhibited, with involution of the adrenal cortex, and hypothyroidism may also occur.

In a symposium recently presented at the Mayo Clinic[1] certain problems arising out of the clinical use of cortisone have been reported. Attention is drawn to the possible appearance of gastro-intestinal manifestations such as ulcers and their complications—haemorrhage and perforation—during or after administration of cortisone or corticotrophin. The conclusion is reached that these hormones may be a causative factor, but can obviously not be the only one, considering the large numbers of patients who have been treated with these drugs without developing the complications.

The psychological response to the hormones has been the subject of numerous reports following the observations of the original investigators (Hench *et al.*) on the dramatic changes in ego-relationship produced by these drugs. A large percentage of patients who receive cortisone experience elevation of mood, which may occasionally be very marked. Variation in mood can result from the relief of the chronic and painful symptoms of the underlying disease, but this is not the full explanation, because marked psychological responses may be experienced in the absence of any physical change, while sometimes psychological changes appear some time before physiological changes are produced by the hormones. A variety of psychiatrical symptoms may be revealed by patients receiving cortisone. They appear to be the consequences of the disruption in the internal environment which the drugs produce. Some of the more obvious psychodynamic aspects are considered within the concepts of homeostasis, integration and adaptation.

It is emphasized by Slocumb in his presentation that the maintenance of a patient with rheumatoid arthritis

Slocumb beklemtoon dit dat om 'n pasiënt wat aan misvormende gewrigsontsteking ly in 'n toestand van kroniese hiperkortisonisme te hou selde indien ooit geregverdig is. Daar bestaan nie slegs die welbekende risikos van osteoporose, beenbreuke, onderdrukking van simptome van wisselende besmettings en swak dulding van operasies en skok nie, maar daar bestaan ook gevare verbonde aan die wegneem van die middel. Skielike staking van die terapie veroorsaak hewige reaksies, maar selfs met die vermindering van die dosis bestaan daar gevaar, minstens tydelik, van algemene vrugbindweefsel- en bloedvatreaksies wat op *lupus erythematosus* of *periarteritis nodosa* lyk. Met 'n ligte reaksie word verhoogde afmatting, pyn in die spiere en gewrigte en emosionele onewewigtigheid bespeur, maar met 'n hewige reaksie word koors, hartsakontsteking, borsvliesontsteking, verdikking van die long, randstandige senuweeontsteking, reënboogvliesontsteking, huidsere en bloedveranderings, insluitende die teenwoordigheid van *lupus erythematosus* (L.E.) selle, bespeur.

Die reeks artikels in hierdie simposium wat afkomstig is van die plek waar die waarde van kortisoon en verwante middels ontdek is, beklemtoon die noodsaaklikheid van uiterste versigtigheid en waarneming van pasiënte aan wie hierdie kragtige middels toegedien word.

REFERENSIES

1. Symposium (1953): Proc. Mayo Clinic, **28**, 641.

in a state of chronic hypercortisonism is seldom if ever justified. Not only are there the well-known risks of osteoporosis, fractures, suppression of the features of intercurrent infections, and poor tolerance to operations and shock, but there are dangers from the withdrawal of the drug. Sudden cessation of therapy produces profound reactions, but even during adjustment to reduced doses there is risk, at least temporarily, of panmesenchymal and panangiitic reactions, resembling lupus erythematosus or periarteritis nodosa. When the reaction is mild, increased fatigue, aching in muscles and joints, and emotional instability have been noted, but when the reaction is severe the features include fever, pericarditis, pleurisy, lung consolidation, peripheral neuritis, iritis, ulcers of the skin and blood changes, including the presence of lupus erythematosus (L.E.) cells.

The series of articles in this symposium, coming from the place of discovery of the value of cortisone and allied substances, emphasizes the necessity for great care and observation of patients to whom these potent agents are administered.

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ABSTRACTS : UITTREKSELS

Leitch (1953): *Vitamin B^{12} in Massive Dosages for Herpetic Lesions, Northw. Med.*, **52**, 291-292.

Vitamin B^{12} in massive dosage was used to treat a 61-year-old male patient with herpes zoster. Pain was severe and lesions became more hemorrhagic and extensive in spite of the use of aureomycin, thiamine hydrochloride, and barbiturates with codeine. It was decided to try vitamin B^{12} and to discontinue all other medication except sedation.

A 1,000-mcg. dose was injected, half into each buttock, and this was repeated the following day. Thereafter, for 3 more days a 1,000-mcg. dose was given in more concentrated form (1,000 mcg. per cc. instead of per 10 cc), after which the dose given was reduced. Within 24 hours after administration of the first B^{12} injection the herpetic pain disappeared and no further sedation was required. Within 48 hours from the time of initial dose the lesions had retrogressed and healing was in progress.

Following the good results secured in this case B^{12} was also employed in 4 additional cases of herpes zoster, all of less severity than this first one, however. In all cases pain subsided or ceased entirely within 24 hours after the first dose of 1,000 mcg. of B^{12}. Retrogression and healing of the herpetic lesions began in 36-48 hours. Treatment was generally concluded in 4-8 additional days with dosage gradually reduced toward the close of this period.

Excellent results were also secured in one case of herpes simplex. In none of the total of 6 cases was there any undesirable side-reaction following daily intramuscular injections of B^{12}.

J. Zapata-Díaz, E., Cabrera C. and R. Mendez (1952): *An Experimental and Clinical Study on the Effects of Procaine Amide (Pronestyl) on the Heart*: *Am. Heart J.*, **43**, 854-870.

Procaine amide is rated the drug of choice in cases of arrhythmias of ventricular origin, including extrasystoles, ventricular flutter, and paroxysmal ventricular tachycardia. It is active either orally or intravenously. In this study 37 patients with one or another type of arrhythmia were given procaine amide, and in addition to the effect in ventricular arrhythmias it was found that the drug may resolve and eliminate auricular extrasystoles and supraventricular paroxysmal tachycardia.

Procaine amide may slow down the rate of auricular fibrillation or flutter. but acetylcholine is preferable in paroxysmal auricular tachycardia. Procaine amide may be used where acetylcholine has not given the desired results and where ventricular extrasystoles resulting from digitalis over-dosage are present.

In the latter type of case caution should be observed that ventricular flutter or fibrillation does not develop. Sufficient doses of procaine amide depress the excitability of both the auricle and the ventricle and intravenous or local injection seems to offer future possibilities in cardiac surgery. Procaine amide has a greater effect on intraventricular conduction when given as a single intravenous injection than when the same amount is given by slow venoclysis.

James (1953); *Treatment of Clinical Pneumonia in Practice (From: Primary Atypical Pneumonia, J. Amer. Med. Assoc.*, **151**, 810-813.

An investigation was carried out to determine which of the antibiotics currently available is of the greatest value in the treatment of clinical pneumonia in general practice. The results indicated that for an initial treatment penicillin was at least as good as aureomycin or chloramphenicol and resulted in a lower incidence of toxic side-effects.

The cost of treating an average case of pneumonia with penicillin was found to be about one-third the cost of treatment with aureomycin, chloramphenicol, or terramycin. Sulfonamides are still of substantial value in treating clinical pneumonia.

In managing clinical pneumonia, initial treatment by penicillin or sulfonamides, plus postural drainage of the affected area wherever possible, is recommended. One of the newer antibiotics may be given if there is no response to this regimen of treatment after 3 days. Generally, any of the 3 newer agents will prove effective in penicillin-resistant pneumonia, but they should probably not be given initially, and if used must replace and not supplement simultaneous use of penicillin, because of the possibility of antagonism.

There is clinical evidence that a combination of aureomycin and penicillin is inferior to penicillin alone in certain pneumococcic infections.

CHAIN-SYNERGIES IN NEUROMUSCULAR RE-EDUCATION

IN THE INFANTILE CEREBRAL FLACCID-SPASTIC SYNDROME

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Orthodox Treatment. Faith in authority as well as the habitually easy sticking-to-routine has had the result that in the treatment of the infantile cerebral flaccid-spastic syndrome there still exists one widely accepted method; and physiotherapy treatment (kinetic therapy) as a rule concentrates on isolated muscle contraction.

For example, House [1] directs treatment towards individual muscles. Phelps advises that 'all exercises must bring into play only the desired muscles.' [2] Levitt [7] writes, 'The child must acquire the components of movement before it can perform a whole action'.

Pohl [3] advocates contraction of the individual muscles controlling each joint. He says,[4] '. . . . the first step is to establish in the nervous centres an awareness of the individual muscle. Proper contraction of the fibres within the muscle is next sought by a process of directing the neural impulse to the muscle tendon, where action is normally begun.' He gives [5] a typical example of how some schools of thought try to elicit such a single muscle contraction; also, for example, what they expect of a cerebral palsied child in training dorsiflexion of the foot, the tibialis anterior being flaccid:[6] 'The attention of the patient is directed to the attachment of the tibialis anterior muscle and the foot is dorsiflexed by the therapist . . . . The patient is instructed that this motion takes place as a result of the pull of the muscle beginning at the point of bony attachment.' Then the same procedure is followed concerning the attachment of the opposing calf muscles at the heel: 'The attention of the patient is focussed to the points of attachment of the muscles before each movement.'

It seems that the idea of concentrating on *individual* muscle contraction in the flaccid-spastic syndrome has its origin in the treatment of muscles paralysed through poliomyelitis. There we might hear the pediatrician properly prescribe: 'Stimulate faradically tib. ant.'

I.Q. and Treatment. To practise individual muscles or small muscle-groups, in other words, to practise isolated or highly skilled movements, is a difficult task even in the case of adults of average intelligence. How then can one expect children to concentrate on the attachment of a single muscle?—the more so as the intelligence of c.p. children of the flaccid-spastic type is often enough below the average. Josephy [8] explains: '. . . . if the brain of an infant or child—that is, a brain which not yet has reached the stage of maturity—is damaged in any way, symptoms as a clinical response to such damage may appear in two fields, namely that of mentation and that of somatic, especially motor, performance.' The brain functions as a unit. Therefore every disturbance in one part is—more or less—felt in the whole brain.

Heilman [9] compares intelligence-test ratings of c.p. children determined by different observes in 5 recent studies. The percentage reported as mentally defective was as follows: 49% of 261 cases,[10] 43% of 90 cases,[11] 47% of 340 cases,[12] 36% of 133 cases [13] and 47% of 178 cases.[14] Combining these data, 45% of 1,002 c.p. children were found to be mentally defective. Justly Heilman [14] adds, 'The intelligence of a child not only affects his ability to profit educationally, but it may also affect his ability to benefit from therapy.'

Besides the low I.Q. the short attention-span of these children also renders treatment difficult.

All this shows clearly enough that treatment methods which need an average or even high intelligence must of necessity be doomed to failure—unless one has a free hand in selecting suitable cases.

VOLUNTARY ISOLATED MUSCLE CONTRACTION

No doubt, to attempt a voluntary isolated muscle contraction—if such a thing exists at all—would be a most difficult task, and that even for highly intelligent and co-operative patients. But, if a voluntary isolated muscle contraction exists, for what practical purpose does one need an isolated muscle contraction? Does such a voluntary isolated muscle contraction really exist?

Since the days of the great pioneer of neurology, Hughlings Jackson,[15] we have known that the paralysis from a circumscribed lesion of the pyramidal tract is not of a single muscle but of a whole movement. For instance, the isolated opposition of the thumb may be impossible, while flexing *and* opposition of the thumb as part of clenching the fist remains possible.

Walshe [16] writes, 'The cerebral cortex is concerned with movements and knows nothing of muscles. 'Therefore a lesion of this mechanism causes a paralysis of movement and not a paralysis of individual muscles. Therefore also a muscle which takes part in two movements may function in the unaffected movement and not function in the affected one.

Specifically concerning the important protagonist-antagonist relation Hoefer [17] remarks, 'One does well, however, to remember that simple movements . . . . are to some extent a laboratory abstraction, and that for everyday movement the relation of protagonist and antagonist may change to one of synergism.'

Only Fulton [18] continues to maintain that isolated movements, *sometimes of single muscles*, but more often of synergic muscle groups, can be obtained by electrically stimulating the caudal surface of the precentral region ('area 4'). Individual responses may—according to him—be evoked in the biceps, triceps, flexor longus digitorum, and even in a single interosseus. On the other hand Bosma and Gellhorn [19] showed that, when they electrically stimulated various cortical foci in a monkey (*Macacus rhesus*) anaesthetized with 'dial', not single muscles or parts of muscles were activated, but functionally-associated muscle-groups. By stimulating an individual focus they elicited movements comprising more than one joint. Gellhorn [20] demonstrated for a limited number of muscles that on cortical stimulation of the foreleg area the muscles were activated in certain functional groups which were classified as biceps and triceps complexes respectively. He stated [21] that '. . . . stimulation of the cortex frequently leads to activity of tibial and hamstring muscles,' which is of special interest in connection with the paralysis of tibialis anterior referred to above.

More recently Gellhorn and Johnson [22] have greatly expanded these investigations on 'functional groups' and the complexes have been clarified. Gellhorn [23] holds that the organisation of the motor cortex cannot be represented by a cortical mosaic with different, sharply delimited, foci for different muscles but seems

rather to involve extensive overlaps of groups. Here we are back again at Hughlings Jackson's opinion of 75 years ago.[24]

The theory that slight stimulation might evoke single-muscle response and a stronger stimulus more compound movements was examined by Gellhorn,[25] who found that '.... even under conditions of threshold stimulation the muscle response is multiple and appears in the form of activity in functionally-related muscle-groups.'

So nowadays Hughlings Jackson's [24] findings are almost generally confirmed, namely that even the most individualizing motor neuron, the motor cortex, knows nothing of single-muscle contractions but only of 'very complex movements in each of which many muscles serve.'

UNSATISFACTORY METHODS OF TREATMENT

The habitual physiotherapy treatment starts with passive motion, leading gradually to active-assisted motion—active motion with gravity eliminated—active motion against gravity—active resisted motion—and finally combined motion. Some medical men of this school of thought seem to accept the flaccid-spastic state as something completely irreparable by physiotherapy, and with that in view they carry out brain and nerve operations, tendon lengthenings, muscle transplants, etc., disregarding the possibilities of kinetic therapy before, after, or instead of the operation. On this point Malkin and Jackson [27] very fittingly remark, 'Even when surgery is contemplated it must be preceded by a long period of physiotherapy and it may well be found that operational treatment becomes unnecessary.' And du Toit [28] says, 'Proper physical therapy after operation is usually more important than the operation itself.' An operation in this field of discussion should not be regarded as treatment, but as a means of removing an obstacle to the real treatment by muscle re-education.

Instead of kinetic therapy not only operations are carried out, but also calipers and braces are prescribed, special boots with irons and straps, splints and other devices and also drugs are administered. If these drugs work at all during the training period, then their carry-over value remains still doubtful. Abbott [29] in an up-to-date review of c.p. methods, concludes, 'Drug therapy is still in the experimental stage.' The same impression is given by Perlstein [30] and by Mitchell.[31]

Progress with these methods are disappointingly slow, and it is small wonder that dissatisfied experts—foremost members of the medical profession, and also physiotherapists—searched for new ways of treatment. And this is what they found:

PRESENT-DAY TRENDS IN NEUROMUSCULAR RE-EDUCATION

These are based mainly on 2 principles: (*a*) the use of reflexes, and (*b*) developmental ideas. Neither tries to re-educate the 'involved muscles' directly. Thus they do not attempt to build up the tumbled-down top of the building ignoring its basement, but they make ample use of what there is left of the foundation. They first reinforce this thoroughly before they start to build up the top again.

(*a*) *The Use of Reflexes.* More and more treatment has been based on primitive reflexes, starting mainly from the research work done by Magnus,[32, 33] de Kleijn [32] and their school on tonic neck and labyrinthine reflexes.

Thus, Kabat [34] is of the opinion that postural and righting reflexes are valuable in the treatment of paralysis.

Fay [35] utilises postural reflexes, reactions of defence, tonic neck reflexes, and pattern movements.

Yamshon, Machek, and Covalt [36] emphasize the importance of tonic neck reflexes for treatment purposes.

Yamshon [37] again points out the favourable influence of postural reflexes on the muscles of spastic hemiplegics.

K. and B. Bobath [38] make use of tonic neck and labyrinthine reflexes in all positions of the body in space as a principle of treatment in spastic paralysis. They however endeavour to break up the typical reflex patterns of posture and movement.

Ghiora and Adler [39] report good results in the rehabilitation of hemiplegics through the use of tonic neck and labyrinthine reflexes.

I myself [40] stressed the importance of mirror-synkineses for the neuromuscular re-education in infantile cerebral hemiplegia—plus 'mass movements', together with neck, optic and labyrinthine reflexes.

(*b*) *Developmental Ideas.* In close connection with the reflex treatment developmental ideas have come to the foreground. They are based mainly on the work of Gesell and his collaborators.[41, 42, 43]

Thus we find, for example, with the otherwise rather orthodox J. F. Pohl,[44] the developmentally-founded practice sequence of turning over, sitting up, etc. Similarly Shriner [45] stresses the point that the natural development of motor control should be followed; thus, kicking reciprocally—rolling over—sitting up—creeping—standing—walking. And Denhoff, Smirnoff and Holden [46] advocate building proper developmental patterns into useful activities. K. and B. Bobath [47] insist on sticking to the developmental sequence of patterns of movement in treatment, and B. Bobath [48] again strongly stresses the necessity of 'following closely the developmental scale of motor behaviour of the normal child'.

Besides these two main groups of ideas the concept that the most differentiated voluntary movements, being the phylogenetically youngest movements, suffer first and most, and come back last, now seems to be generally recognized, and is taken into account in training.

Some at least of the much-disputed new ideas seem justly to boast of successful application and at the same time proffer a scientific explanation for their methods. Here I speak of:

(1) *The Mirror-Synkinesis Treatment in Hemiplegia.* This basic form of treatment seems to be still generally unknown. As it has been amply described in a previous article [40] I wish to concentrate here on the other successfull basic method of group (*a*), viz.

(2) *The Chain-Synergy Treatment.*

THE CHAIN-SYNERGY TREATMENT

This method is usually called the 'mass movement' pattern method. By 'mass movement' one understands, not something great and solid, but an isodirected movement comprising several adjacent joints, as, for example, a total bending or a total stretching of one leg, comprising the hip, knee, and ankle joint. It is a compound movement which, although it consists of small single movement-units, is essentially one indivisible movement-unit and thus quite different from its component parts; it is *gestalt*. An isolated joint movement (e.g. independent dorsiflexion of the foot) or a single muscle contraction, is not a 'mass movement'.

In connection with neuromuscular disorders one understands under 'mass movement' an *active movement of one joint by muscles which are unable to perform this movement when called on to do it alone, but yet are coerced to perform it as part of a more comprehensive movement comprising a chain of adjacent joints.* Foerster[19] calls this type of movement 'compound movement', taking it to be typical of an origin in extra-pyramidal areas. In this connection he [50] also mentions flexor and extensor 'synergies'; for that is what these so-called 'mass movements' really are—*synergies of related muscle-groups.*

According to Schaltenbrand [51] such a 'mass movement' was first observed by some nurses of the Salpétrière, famous since the days of the great Charcot. They had noticed that with patients suffering from spastic paralysis

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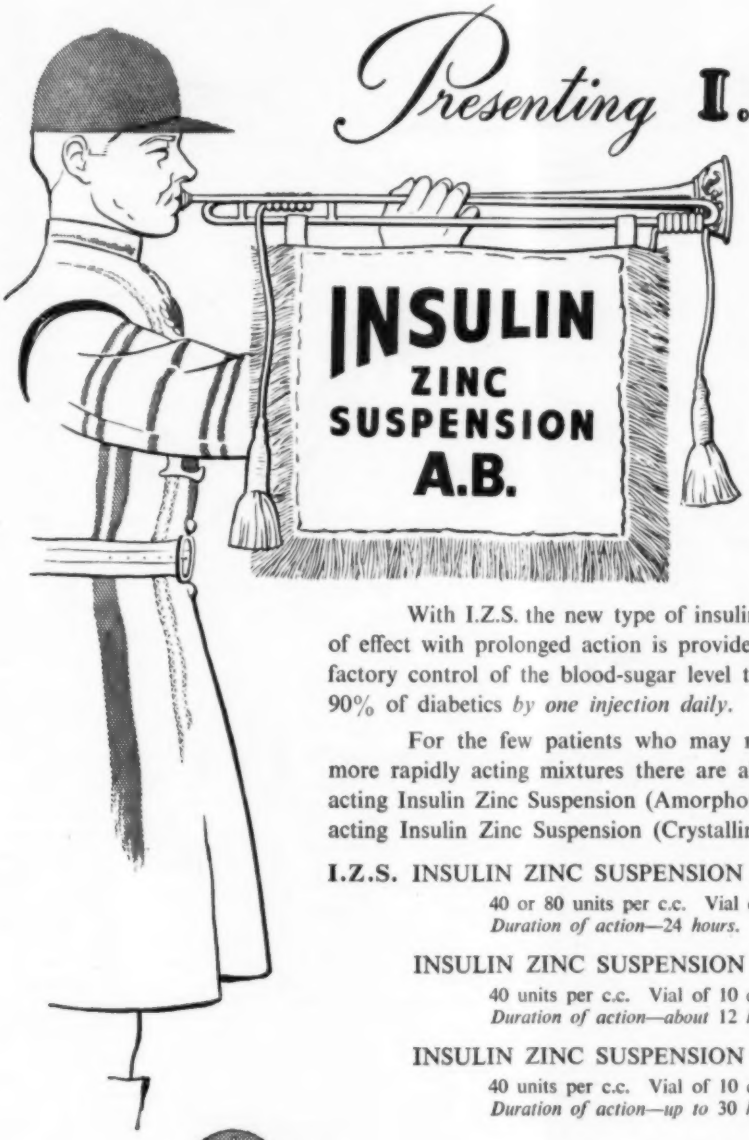

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a forced plantar flexion of the foot reflectorily elicits a bending of the whole leg—a phenomenon now called the 'Marie-Foix reflex'.

Foerster [52] most clearly describes 'stereotype synergies' with hemiplegics (flexion and extension synergies). The flexion synergy, which falls under the present discussion, consists of simultaneous flexion (and often abduction) of the femur, flexion of the crus, dorsiflexion and supination of the foot (with adults, whereas with children pronation is often stronger), and dorsiflexion of the toes. Elicited by electrical stimulation of the extra-pyramidal cortical areas, these synergies also become apparent in epileptic seizures starting from extra-pyramidal areas. At first synergies are the only movements which can be performed actively by a patient who of his motor cortex has only the extra-pyramidal areas at his disposal.

Foerster emphasizes the point that these movements can be started on any point of the synergy, be it now the hip, or the knee or elsewhere. In any case, if a part movement is intented then either the whole synergy comes into being or nothing at all.

Foerster affirms that these flexion and extension synergies were described by L. Mann (1895) [53] before Struempell (1897). This, however, is not quite correct; Mann does not mention the 'none or all' flexion or extension contraction of an extremity, while Struempell had described his 'tibial phenomenon' as early as 1887.[54]

A sort of resisted 'mass movement' method has been extensively used by W. M. Phelps' U.S.A. pioneer school of physiotherapeutic treatment for cerebral palsied children. From there it has spread to many other countries. The name given to this treatment was 'Confusion Motion Treatment', or 'Confused Motion Treatment'; other names are 'Confusional M.T.', 'Automatic M.T.', and 'Sympathetic M.T.'.

Confused Motion Treatment. This treatment is clearly described by 3 outstanding physiotherapists out of Phelps' school: E. Collis, who introduced Phelps' methods of training c.p. children to England, P. F. Egel, and P. St. James. Collis [55] speaking of muscles which do not respond to the exercise of conscious control in some spastic cases, writes, 'It has been found that such 'flaccid' muscles can be trained to respond to resisted motion elsewhere in the body. After consistent training, "sympathetic" or "confusional" contraction results in automatic function.' Egel [56] mentions that this sort of treatment is used only for treatment of O.C. (zero cerebral) muscles, i.e. muscles which have no ability to contract at will.

St. James [57] writing of 'confusion motion', says that it indicates the resultant contraction of one muscle or group of muscles by resisted motion to an unrelated group. From this definition it is apparent that this school does not aim at 'mass movement' in the sense explained above, because it claims to elicit muscle-contraction by resisted motion to an *unrelated* group. Although this is possible it certainly cannot be applied to the paradigm which is generally cited by Phelps' school. They speak of 'the contraction of zero cerebral or pathologically-weak anterior tibial by resisted knee and hip flexion.' [58] Certainly knee and hip flexion are very much related to ankle flexion; they are isodirected movements. The term 'Confused Motion', therefore, is confusing when used in connection with coercive 'mass movements' elicited by the contraction of one or more muscle-groups spreading to a neighbouring, functionally related, O.C. muscle-group.

Kraus [59] also recommends 'confusion movements'.

The term 'confused motion' and similar terms should in my opinion be confined to cases which really respond to the definition given by R. St. James; e.g. resistance to an infraspinatus eliciting contraction of an O.C. tibialis anterior. In contradistinction thereto, eliciting contraction of an O.C. tibialis anterior by resisting ipsilateral hip and knee flexion should be called either 'mass movement' or a still better term, to be proposed later on, should be used.

This 'mass movement' was introduced into training of c.p. children by Phelps. He writes,[60] 'I first became aware of it in 1927-28 while examining a spastic hemiplegic boy who had no apparent power in the dorsiflexors of the affected foot. This boy was extremely co-operative and would dorsiflex the other foot on command but was physically completely unable to dorsiflex the affected one, and no power could be felt in the muscles. During the examination he lifted a heavy box with his knee to place it on a table and I saw the dorsiflexors contract. I then tested him out for resisted knee flexion in the sitting position and could always get a contraction in these muscles.'

In the abovementioned paradigm we recognize the well-known *Struempell's Phenomenon*—also called 'tibial phenomenon' or 'tibial sign'. Adolf von Struempell (1845-1900), professor of neurology at the University of Erlangen, found in hemiplegics that with a fully-extended leg dorsiflexion of the foot is impossible. When, however, the knee is flexed and the patient flexes his hip against resistance, the foot dorsiflexes and supinates. [61] In Struempell-Seyfarth [62] we read, 'Most often we find associated movements in the muscles of the same limb. Expecially often with hemiplegia or with spinal paralysis one observes that the patients are unable to draw up the leg towards the body without at the same time performing a strong dorsiflexion of the foot as an associated movement (tibial phenomenon). In this case often an isolated dorsiflexion of the foot is impossible, whereas with the generalized flexion of the leg the foot is always co-flexed. Thus a so-called group innervation takes place here.'

Walshe [63] mentions this phenomenon, thereby rejecting the opinion of Marie and Foix [64] (also expressed by Struempell and Babinski) that this phenomenon is to be regarded as an 'associated movement', as here dorsiflexion of the foot occurs as an *integral part* of another movement. Walshe continues, 'We know that isolated movements, especially of the distal segments of the limbs, are the first to suffer in a condition of hemiplegic weakness, while the more deeply organized mass movements of the limbs, which have a complete representation of the reflex levels of the neuron system, are very much more resistant.'

Foerster [65] writes, 'The various parts of the flexion or extension synergy become the more outspoken the stronger the cortical impulse is. Dorsiflexion of the foot within the flexion synergy becomes more abundant if the flexion of the leg is done against resistance, whereby also supination becomes more prominent (Struempell's tibial phenomenon).'

As Struempell [66] first pointed out the role of resistance and drew the attention of the medical world to the phenomenon, while it was Phelps who showed its wide practical therapeutical use, it would be only fair to term this valuable *resisted* leg flexion synergy 'Struempell-Phelps manipulation.'

In resisted hip and knee flexion (eliciting active dorsiflexion plus eversion and pronation of the ipsilateral foot) it is in my experience characteristic that the hip, knee and ankle *do not flex simultaneously*, but writhe in a wormlike manner, or as a chain which is being moved

from one end. The movement begins with hip- and knee flexion, thereafter taking hold of the ankle, whereby the foot goes first into dorsiflexion, being held in supination and inversion; thereafter screwing into eversion and pronation. I have already given some reasons why I think the term 'mass movement' does not fit this phenomenon. Here I propose a more adequate term. As it is a sort of a synergy movement and as it progresses chainwise I propose the term *Chain Synergy*.

The return of the full voluntary dorsiflexion movement in its various parts takes place in the same sequence as the movements in the chain synergy.

Why is it that dorsiflexion of the foot is so difficult? Foerster's [67] answer is, 'No doubt the reason for the extremely little efficiency of the foot dorsiflexors is the strong spastic resistance of the antagonistic muscle group.' Yet the Struempell-Phelps manipulation does work with O.C. or weak C. foot dorsiflexors even if the antagonistic muscles appear to be severely spastic and the tendo Achillis seems to cry for the 'healing knife'.

In a supine position, with straight knees, the foot cannot as a rule be *passively* dorsiflexed to the degree to which dorsiflexion can be carried out actively by means of the Struempell-Phelps manipulation. But in the case of a spastic gastrocnemius one can do away with the resistance by flexing the knee (though the dorsiflexors of the foot are still unable to contract independently at will).

The lion's share in the chain synergy movement, resulting in dorsiflexion of the foot, seems to be taken by the hip flexors. Resisted knee flexion in the sitting position (when the hip is of course flexed), as described by Phelps,[60] may elicit dorsiflexion of the foot; but if you then test resisted knee flexion in the prone lying position, when the hip is straight, it becomes quite apparent that this cannot be done without at the same time flexing the hip. Hip flexion alone works much better than knee flexion alone. I do not think that any link of the chain can be left out, without weakening the whole chain synergy and especially its object.

I have dilated on this seemingly small movement of the active dorsiflexion of a foot through a chain synergy for the reason that I believe it to be of great practical importance. In the flaccid-spastic syndrome the foot dorsiflexors are the *locus praedilectionis* of paralysis (see Walshe,[68] Hughlings Jackson,[69] and Schaltenbrand [70], and dorsiflexion of the foot is so often either paralyzed or weakened that methods of its neuromuscular re-education are of great importance. Moreover other methods are not so successfull as the Struempell-Phelps manipulation; and this manipulation is an example of how chain synergies can and should be used in order to regain a lost movement.

Upper Limb. We have spoken of the therapeutical use of the flexion chain synergy of a leg bringing into play linked flexion of the hip, knee and ankle in order to counteract paralysis in extension. In the arm the corresponding picture is paralysis in flexion—briefly a linked flexion of the shoulder (adduction), elbow and wrist (plantar). So in the arm we aim at extension in a manner similar to that in which we aim at flexion in the leg: We attempt a complex stretching movement by pushing against resistance. This can be further facilitated by tonic neck reflexes, i.e. by turning the face towards the involved side. Thereby the whole arm tends towards innervation of the extensor muscles and it is not only the triceps which contracts.[71] Mirror synkineses [40] may also be helpful.

If dorsiflexion of the hand is paralyzed by flaccidity of the protagonists as well as by spasticity of the antagonists, and there are similar symptoms more proximally, then it is useless to try to elicit directly any independent voluntary dorsiflexion of the hand. It is a widely-accepted principle that these symptoms should be tackled step by step from proximal to distal, in the same way as restoration by nature takes place. With the chain synergy method, however, all joints of the extremity are treated as one whole and thus simultaneously.

Dorsiflexion of the hand is sometimes strikingly facilitated by resisted mirror synkineses. In my opinion the chain synergy method is superior to the mirror synkinesis method for rougher movements, while for finer movements the opposite holds good (notwithstanding that according to H. Jackson,[72] in the cortical hemisphere the proximal muscles of the extremities have a greater bilateral representation than the distal muscles). A combination of the synergy and the synkinesis method should be tried. A sort of correction or modification of synergies through synkineses is recommended by Foerster,[73] who also strongly recommends the use of synkineses—*homologe Mitbewegungen*—in the treatment of hemiplegias, a fact of which I was not aware when writing my article on synkineses.[40]

RESISTANCE IN CHAIN SYNERGIES

The above-described chain synergies should, in severe cases, first be carried out with a good deal of resistance. Later on, less and less resistance is required until the patient is independent of resistance through the outside world as well as of chain synergies and mirror synkineses. In mild cases, e.g. paralysis of foot dorsiflexion, no resistance may be necessary through the physiotherapist's hand or through weights or pulleys, but gravity alone may suffice to elicit dorsiflexion; so also in an exercise like climbing a ladder. Even in crawling the desired contraction of the dorsiflexors often appears spontaneously in mild cases. Crawling is a developmentally important item.

Resistance in these cases should preferably be given manually. The sensitive hand of the physiotherapist does much better than any pulley or similar mechanical means and is able to vary resistance far more adequately and with quicker reaction. Kabat [74] drives this point home with the words, '. . . manual resistance allows the greatest range of technical procedures for facilitation and is essential for effective treatment of paralysis.' Besides resistance he [75] recommends Stretch and Reversal of Antagonists as facilitation procedures.

In chain-synergy treatment as in synkinesis treatment resistance plays a most important part in eliciting the contraction of an otherwise cerebrally weak, or even paralyzed, muscle. The same holds good for tonic neck reflexes. The weaker the original response to voluntary

muscle contraction the more resistance must be applied to the other links of the synergy chain.

THE NEUROPHYSIOLOGICAL BASIS OF RESISTED CHAIN-SYNERGY TREATMENT

This resistance seems to work on the basis of proprioceptive reflexes in the same way as, according to Gellhorn and Johnson,[76] proprioceptive reinforcement of cortically induced movements is effected by muscle stretch, and (still nearer to the problem under discussion) particularly by tension produced during isometric contraction resulting from activity of muscles under fixation. And the chain synergy also conforms to what Gellhorn and Johnson found for muscle stretch and isometric contraction, namely, that the resistance to other links of the synergy chain increases the responsiveness in the paralysed muscle and in functionally-related muscles, while that of the antagonists is diminished. Here then we have a case of pathological overflow.

Thus resistance treatment works under the assumption that through maximal resistance—plus other facilitating mechanisms—a summation takes place between the weak cortical stimuli and the proprioceptive impulses, whereby all available motor units of the muscles are excited with each voluntary effort. Overflow from adjacent unaffected links of the synergy chain strengthens the stimuli to the affected link and so might make sub-threshold stimuli potent. Naturally, if the functionally-related adjacent muscle-groups are weak or flaccid we cannot expect an overflow from them to others. Therefore, in this case, we shall not register a response from an O.C. muscle.

But what takes place in the upper motor neuron? Foerster [77] says, 'With most of the interruptions of the pyramidal tract by no means all cortico-spinal tracts fall out. As a rule there is a remainder of extrapyramidal-subcorticospinal commisures left, but also very often a remainder of the pyramidal tract, and with hemiplegias even the whole homolateral pyramidal tract.'

It seems that, like mirror synkineses, chain synergies have their proper place, and that more in hemiplegia than in paraplegia. I am therefore inclined to assume that these chain synergy movements are executed—at least in the beginning—by ipsilateral motor neurones. Penfield and Rasmussen [78] in stydying supplementary motor representation have recently succeeded in finding 'an area from which bilaterally synergic movements may be produced.' This area is in the superior intermediate frontal region within the longitudinal fissure.

Concerning the topography we expect more enlightenment in the near future through the new American 'cerebral palsy brain registry',[79] under Prof. H. Josephy, where brains of the cerebral palsied with reliable histories and clinical observations are studied and correlations are sought between the anatomical-histological findings and the symptoms.

MOTIVATION

We have mentioned various procedures for facilitation. 'Motivation', however, is rarely mentioned as it is physiologically not so easily conceivable as ,for instance, the stretching of a muscle. It belongs to a region 'beyond' physiology. It simply means: Make the patient want to do it because he gets satisfaction or pleasure in doing it. The co-operation of the child is thus ensured, and this is most important for his progress (also see Smirnoff).[80] To find motivation for the desired movements pays rich dividends to the inventive physiotherapist. As a rule *purposeful* movements are preferred by young and old to meaningless ones. Therefore the physiotherapist receives most valuable assistance from the occupational therapist. Carlson [81] advises, 'Train his muscles but keep his mind off his muscles.' This is best done by purposeful movements.

CONCLUSIONS

In the neuro-muscular re-education of children showing the flaccid-spastic syndrome of cerebral origin the widely-used direct single-muscle contraction method is erroneous. Better results can be attained by means of the (resisted) chain synergy treatment method. This is one of our two basic and most efficient methods. The chain synergy method should whenever possible be linked with the other basic treatment method, the mirror synkinesis method. Other facilitation agents should not be omitted.

The physiotherapist should try to attain the required movements through tasks both purposeful and enjoyable for the patient, i.e. motivation should be applied. In this the occupational therapist is helpful.

SUMMARY

The orthodox treatment-method of the infantile cerebral flaccid-spastic syndrome is briefly described mainly in so far as kinetic therapy is concerned.

The habitual concentration on eliciting immediate isolated muscle contraction is erroneous because (*a*) it requires good intelligence and a fair attention-span, which are rarely found in cerebral flaccid-spastic children, and because (*b*) in neuro-physiology such isolated muscle contractions seem to be a pure assumption.

The present-day trends in neuro-muscular re-education are reviewed. They can be divided into two main groups, based on (*a*) the use of reflexes, and (*b*) evolutional ideas. Both groups accept the neuro-muscular state as they find it, and, starting from the existing primitive and reflex movements, they develop more differentiated movements.

From group (*a*) the mirror synkinesis method and the (resisted) chain synergy method ('mass movement' method) are regarded the most important basic methods. As the former has been described in a previous article, only the chain synergy method is expounded. It is explained through Struempell's phenomenon. It is shown that this should not be mixed up with 'confusion motion'.

The great role resistance to the unaffected links of the synergy chain plays is disclosed. Resistance is also important in the synkinesis treatment and in the facilitation through tonic neck reflexes.

It is stated that the (resisted) chain synergy treatment method can be used in connection with the mirror synkinesis treatment method and further faciliated by other agents.

A neuro-physiological explanation of the (resisted) chain synergy treatment method is sought. Finally the importance of motivation and the consequent value of occupational therapy are stressed.

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THE EFFECTS OF HEAT STRESS ON PATIENTS SUFFERING FROM CARDIAC FAILURE AND INFANTILE MALNUTRITION*

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It is the object of this paper to show that hot summer weather, which is rarely more than a nuisance to healthy individuals in South Africa, is potentially dangerous to patients suffering from certain circulatory disabilities.

* Part of a Symposium on *Heat Stress* held by the Baragwanath Medical Society on 29 October 1953.

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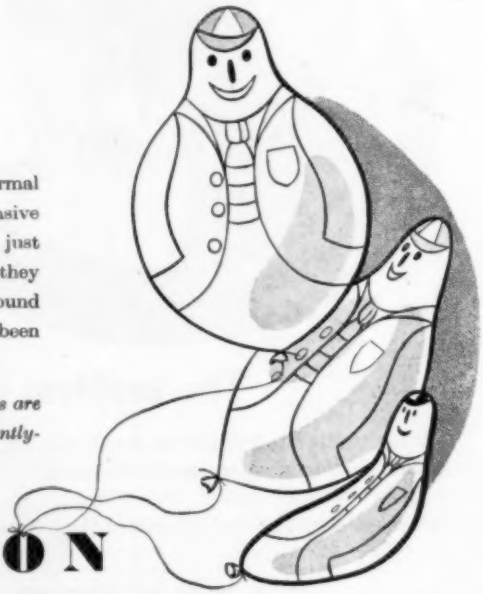

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heat stress developed severe tachypnoea and tachycardia, marked fall in diastolic blood pressure and an increase in pulse pressure.[3] Nearly all these patients showed signs of acute left ventricular failure and had to be removed hurriedly to cooler surroundings. Controls suffering from a variety of non-cardiac complaints displayed much greater tolerance to the same experimental conditions and they secreted more sweat.

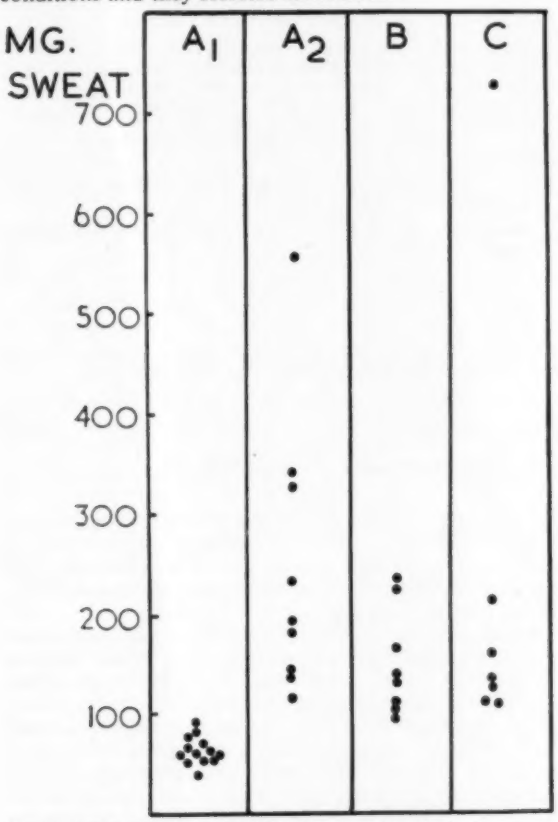

Fig. 1. Sweat secretion of infants (mg. per 6 sq. inches)
A1 Infants with nutritional oedema.
A2 Ditto after partial recovery.
B Normal controls.
C Unacclimatized infants after partial recovery from malnutrition.

Studies carried out at Baragwanath Hospital[1] showed that impairment of sweat secretion is also a feature of infantile malnutrition. Quantitative determinations of sweat secretion were carried out on malnourished infants and controls under standard conditions of heat stress. The results of these investigations are plotted in Fig. 1. Untreated cases of malnutrition secreted very little sweat (column A1). When some of these cases were exposed to the same climatic conditions for a second time 2—6 weeks later, after partial recovery from malnutrition, sweat secretion (column A 2) was of the same magnitude as in the control groups (columns B and C). As was to be expected, infants who were unable to sweat freely had a greater rise of body temperature in response to heat stress than other individuals. However, apart from apathy no manifestations of intolerance to heat were observed in these malnourished infants, probably because experiments were of relatively short duration and temperature and humidity in the air-conditioned room did not put a severe strain on the temperature regulating mechanism of the body.

How can we explain the impairment of sweat secretion, the pyrexia and the circulatory disturbances described above?

Heat is lost from the body (1) by vaporization of sweat and (2) by conduction, convection and radiation. Both varieties of heat loss depend on a liberal perfusion of the skin with blood. The greater the need for cooling of the body, the greater is the amount of blood flowing through the skin. Under severe conditions of heat stress the minute volume of blood pumped through the skin may be 50 times greater than normal.

This prodigious blood supply is made possible by certain circulatory adjustments: (1) an increase in cardiac output up to 300%, (2) an increase in the total circulating volume of blood up to 30%, and (3) a narrowing of the vascular bed of the non-dermal organs.

In congestive cardiac failure there is a restriction of peripheral blood-flow in order to ensure an adequate circulation through the vital organs of the body.[5] Consequently dissipation of body heat presents difficulties in hot environments, as evidenced by a reduced sweat response and a rise in body temperature. If heat stress is of such magnitude that the protective peripheral vasoconstriction of congestive cardiac failure is overcome and peripheral vasodilatation occurs, then it becomes impossible to maintain an efficient circulation through the vital organs of the body. In other words, hot environments increase cardiac work and this may lead to circulatory breakdown in the presense of reduced cardiac reserve.

It is obvious that the danger of an oppressive climate to patients in congestive cardiac failure is of practical importance in a variety of circumstances. Thus, an oxygen tent without properly functioning refrigeration may do more harm than good. To give another example, in recommending to a patient with congestive cardiac failure a change of residence to the coast, one must weigh the benefit of a higher oxygen tension against the potential dangers of a hot and humid climate.

The combination of diminished cardiac output and poor peripheral circulation obtains also in conditions other than congestive cardiac failure; for example, in shock and adrenal insufficiency. However, I have not encountered any references in the literature indicating that these states are known to be associated with an intolerance to heat. I have no personal experience in the management of such cases, and I should like to hear whether surgeons and anaesthetists have noticed an undue susceptibility of these patients to the hot and humid atmosphere of some operating theatres.

Finally, a few words on the pathogenesis of the poor sweat response to heat stress of malnourished infants. Congestive cardiac failure is not a feature of infantile malnutrition. However, there is evidence that cardiac output is small in these cases and that peripheral circula-

tion is poor. Peripheral vasoconstriction is often potentiated by dehydration from diarrhoea and vomiting, and in some instances it is of such intensity that tips of fingers, toes or ears become gangrenous. It is, therefore, not surprising that we can demonstrate in these cases a reduction of sweat response to heat which may even be more pronounced than that encountered in congestive cardiac failure.

An impairment of sweat secretion is likely to be a grave handicap to malnourished African infants in summer, because many of them live in ill-ventilated huts with corrugated iron roofs or are carried on the back of their mothers wrapped in thick woollen blankets. It is almost certain that a poor sweat response is responsible for the pyrexia so commonly seen in these infants during hot summer weather. Other ill-effects can only be surmised. However, since there is an impairment of alimentary absorption,[6] secretion[7] and motility[8] in infants suffering from malnutrition even under normal climatic conditions, it is likely that further deterioration of alimentary function will occur under heat stress by a narrowing of the vascular bed of the alimentary tract and a shunt of blood to the periphery. This mechanism may explain the observation of Hippocrates[9] that 'Invalids bear food worst during summer and autumn, most easily in winter and next in spring'.

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SOME PHYSIOLOGICAL ASPECTS OF ADAPTATION TO HEAT *

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The so-called normal body temperature is considered to be 98.4°F when measured in the mouth, and about 1° higher when measured in the rectum. In general a temperature of 100°F or above is talked of as a fever and the extent of this fever is taken as an indication of the seriousness of the patient's condition. In our research work we have, however, two distinct types of fever to deal with, *viz*: (*a*) toxic fever, and (*b*) artificially induced fever. Both types can reach serious dimensions and are to a certain extent abnormal, but the origin of artificially induced fever can easily be removed, when the temperature will drop to normal levels. The source of this artificial fever can be either internal or external.

The main source of internal heat production is muscular exercise or work. During manual work the rise in body temperature is dependent on the rate of work, the efficiency with which the work is executed and the efficiency of the heat-dissipating mechanisms. A trained person may be able to keep his temperature down, whereas the untrained labourer, because of his inefficient co-ordination and inability to get rid of the produced heat, will develop disproportionately high temperatures. Body temperatures of up to 104°F and higher have been recorded in men doing vigorous exercises in cool, pleasant environmental conditions.

MINING

Mining is a specialized task, requiring manual labour of a rather strenuous type. Lashing rock, for instance, requires an energy expenditure of about 150 cal/sq. m./hr. It is therefore essential that underground labourers should be fit and efficient workers with a circulatory and sweat mechanism which can cope with the internal heat production even under severe conditions of external heat stress.

Most of the mines on the Witwatersrand are confronted with the problem of rock temperatures, which may be as high as 120°F. This heat is radiated toward the human body and constitutes an external source of heat. More important than this, however, is the hot, humid circulating air. Air pulled in at a shaft picks up heat as a result of friction, high rock temperatures, running motors, and other factors. Because of natural water dripping down passages, and water intentionally sprayed in order to allay dust, the mine air not only gets warm but also humid. Mine labourers therefore work in almost saturated air and it is necessary to acclimatize them to hot, humid conditions.

The reason why the acclimatized individual is capable of working under severe conditions of heat stress without developing excessive body temperatures is to be found in the physiological changes which take place during the acclimatization process. These changes are mainly circulatory:

1. There is first an *increased peripheral blood flow*[1]. The skin blood vessels act like the radiator of a car; the bigger the surface the better the cooling. Capillaries open up, more arterio-venous anastomoses develop and a general dilation takes place.

2. Then there is an *adjustment of blood pressure*.[2]

3. The most important factor in the adaptation to heat is, however, an *increase in blood volume*. Because

* Part of a Symposium on *Heat Stress* held by the Baragwanath Medical Society on 29 October 1953.

of the vasodilation mentioned above a diminished venous return and a faster-beating heart are inevitable during the first day or two. After an exposure of only 2 or 3 days, however, the deficit between demand and supply is compensated for in an increased volume of blood. Increases of up to 30% have been recorded.[3]

4. This increase in blood volume contributes to the progressive *slowing of the pulse rate.*

5. As a result of increased efficiency and better economy the *metabolic rate is decreased.* This change is reflected in the *gradual lowering of work temperature as well as resting body temperatures.* The temperature-regulating mechanism seems to be set at a new low level and sweating starts sooner than during the first few days.[4] Basal metabolic rates 10% lower than normal have been measured in acclimatized subjects.[5]

6. During acclimatization and usually after the above-mentioned changes have taken place an *adjustment of the water and mineral exchange is made.* The amount of sweat given off is increased and there is to be reason to believe that the salt secretion is diminished.[6]

Only when all these changes have occurred can the labourer be regarded as fully acclimatized to the conditions to which he has been exposed. To reach this goal it is essential that he works, and works hard—sitting in heat does not have any beneficial result. It should furthermore be remembered that a man acclimatized at, say, 90°F is not fit for work at 93°F without further acclimatization. To ensure adequate adaptation to all conditions present in Reef mines it is necessary that labourers be acclimatized in the hottest normal working-places.

The adequate and efficient acclimatization of mine labourers has been the main interest of the Applied Physiology Laboratory during the past year or two. As the result of extensive experimentation on the physiological effects of heat stress on Native labourers, a new method of acclimatization has been worked out. This method, known as the Transvaal Chamber of Mines Two-Stage Method of Acclimatization, has now been adopted by 6 mines and has proved itself to have considerable economical, physiological and psychological advantages. The practical details are briefly as follows:

RESEARCH

Raw recruits are individually questioned as to their state of health, etc., and then sent to work at full production rate in a 'cool' stope, where the saturated air temperature is not more than 87°F. During the 6 days spent in this stope they are toughened, trained to their tasks and partially acclimatized. This period is followed by 6 days of hard work in a 'hot' stope with an ideal temperature of 91-92°F Wet Bulb, and a good wind-velocity. Rectal temperatures are taken at about 11 a.m. during the first 2 days in each stope in order to prevent excessive rises and to eliminate those with disease conditions. On completion of this course the men are fit for work anywhere in the mine.

The advantages of this method are that the period of acclimatization is cut down, production is increased, sick men or men nursing a disease are weeded out and the acclimatization is probably more complete than with previous methods.

Inadequate acclimatization is dangerous when work is to be done in saturated environments of 87°F and above. If the unacclimatized subject is made to work hard in a hot humid atmosphere the skin blood-vessels will dilate, the venous return will be low, and the heart will be required to beat faster in order to deliver blood to the oxygen-demanding muscular system. If these demands are too great a protective phenomenon emerges which will prevent or curtail further muscular effort. This phenomenon is known as 'heat-exhaustion' or 'heat-collapse', and the symptoms are headache, dizziness, a general feeling of weakness or even collapse, although the body temperature of the subject may still be within normal limits.[7]

It is to be understood, however, that in a subject with a damaged heart or some other cardiovascular disability this strain, which normally would result in heat collapse, may cause heart failure and death. The so-called heat-stroke cases which are annually reported from large American cities during heat-waves really belong to this category.

In real heat-stroke the body temperature of the subject increases steadily because of his inability to dissipate heat. After a few hours the critical point of body temperature, about 107°F is reached, and the heat-regulating system breaks down. The symptoms of heat-stroke include a high body temperature with acute mental excitement, delirium, convulsions, muscular twitchings and tremors and, if not fatal, may leave a permanent disability of some sort.

A well-acclimatized and healthy subject should not normally contract heat-stroke, but certain factors may eliminate the acclimatization effect:

1. Conditions of ill-health, such as influenza, malaria and skin disorders will render a subject more prone to heat-stroke. In an experiment conducted by the Applied Physiology Laboratory men in poor health showed rapid and excessive rises in body temperature when they were subjected to exercise in only mild environmental conditions.[8]

2. Alcohol has an adverse influence on the adaptive mechanism of the body, and the consumption of large amounts of liquor probably renders a person more prone to heat-stroke.

3. Excessive work rates and abnormally severe environmental conditions will also result in high body temperatures and heat-stroke.

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THE CRIPPLE PROBLEM FROM THE NATIONAL POINT OF VIEW

G. D. DU TOIT, F.R.C.S.

Johannesburg

Since the National Council for the Care of Cripples in South Africa came into being 14 years ago, the rehabilitation services for Cripples have permeated the country.

Technically we were helpless. The vast reservoir of untreated crippledom remained relatively untouched. In 1941, there were only 7 surgeons practising Orthopaedics; today there are 46 registered Orthopaedic Surgeons in South Africa and a number in training here and abroad.

An estimated 56,000 cripples require attention now, the majority capable of physical, economic and psychological re-adjustment.

The National Council for the Care of Cripples plays a major part in receiving or providing hospitalization, medical care, physiotherapy, occupational therapy, orthopaedic apparatus, education and vocational training and placement of disabled persons. The National Council has initiated or subsidized every type of service in this field, even to training orthopaedic mechanicians here and overseas, and providing study-bursaries for orthopaedic post-graduates, physiotherapists and other aides. The orthopaedic training of nurses was initiated, sister tutors being imported.

The National Council co-ordinates the services of a number of regional associations and, through them, is concerned in developing the decentralized clinics which bring the team of skilled workers to George, Worcester, Wolmaransstad, Ermelo, all the Reef towns, and elsewhere.

There are now 44 acute hospitals, hospitals for chronic sick cases, hospital schools, and special units in general hospitals, catering for the orthopaedic needs of cripples of all races in South Africa. A number of these units are kept going by the efforts of tireless voluntary workers, gathering the major part of the funds both in capital expenditure and maintenance.

Hundreds of disabled children have been assisted back to activity, to education, to vocational training and to economic self-sufficiency. The misfits, the cases not falling readily into acknowledged groupings, find in the National Council the willing hands, the kindly help and the gentle approach for which there can be no substitute. In difficult matters such as the hospitalization, training and general education of cerebral palsy cases, the Cripples' Care Associations found a way, established institutions and took the lead.

At the Universities of Cape Town and Johannesburg teaching of orthopaedics and traumatic surgery was given a fillip with substantial donations and the creation of lectureships. The University of Cape Town has now created a Peter Moll and Nuffield chair of Orthopaedic Surgery, very substantially the outcome of voluntary effort on behalf of cripples.

Lord Nuffield's generous gift of £100,000 in 1938 made possible the initiation of a number of new units, after-care homes, training schemes etc., but the need is so vast and the demand so ever-present that very substantial sums are needed annually to bring the benefits of the service to those in need of it. The National Council acts as a central bureau for the registration of all cases requiring attention. It acts as a source of information and knowledge on innumerable problems. Contact is retained with overseas organizations doing similar work. Government departments are assisted in coming to grips with the problems. Gaps in existing services are discovered and filled. It is intimately concerned with ensuring that no cripple who can benefit from medical attention escapes the net, and that no case capable of rehabilitation remains a permanent drain on public funds, and that no disabled person requiring apparatus, treatment or training should lack information about where to obtain help. It is concerned with taking these medico-social services to the remotest boundaries of the platteland.

Although the European work done is still inadequate, the vast problem amongst non-Europeans is being tackled energetically and on many fronts.

The medical profession is only vaguely aware of the work done by this particular national voluntary organisation. Any doctor with a cripple problem-case to solve, is assured of ready co-operation by the local Cripples' Care Association or the head office of the National Council for the Care of Cripples at Automutual House, De Villiers Street, Johannesburg. Whether a bed in an institution is required, or an orthopaedic appliance, or the address of the nearest logopedic training centre, or vocational training, or a chronic cripples' institution, it would be worth while enlisting the aid of this voluntary organisation.

The main source of revenue for the National Council is derived from the sale of Easter Stamps during March each year. Each purchaser of Easter Stamps contributes to the continuation and extension of this Social Service.

FIRST WORLD CONFERENCE ON MEDICAL EDUCATION

(REPORT BY G. A. ELLIOTT, M.D., F.R.C.P., OFFICIAL REPRESENTATIVE OF THE MEDICAL ASSOCIATION OF SOUTH AFRICA)

As a delegate of the Medical Association of South Africa and as the representative of the University of the Witwatersrand I attended the First World Conference on Medical Education convened by the World Medical Association in London on 24-29 August 1953 and following is a summary of the Conference which was attended by 600 delegates from 59 countries representing 92 medical faculties.

Bodies other than medical faculties were represented, such as medical associations of many countries, licensure bodies, general practitioners and medical students.

The conference agenda was divided into 4 sections:

A.—Requirements for entry into Medical Schools
Vice-President: Dr. V. Johnson (U.S.A.)
Rapporteur. Dr. Raymond Whitehead (Manchester)

B.—Aims and content of the Medical Curriculum
Vice-President: Sir A. L. Mudaliar (India)
Rapporteur: Dr. A. Morgan-Jones (Manchester)

C.—Techniques and methods of Medical Education
Vice-President: Professor A. Hurtado (Peru)
Rapporteur: Professor Ian Aird (London)

D.—Preventive and Social Medicine
Vice-President: Professor A. Stampar (Yugo-Slavia)
Rapporteur: Dr Charles Fletcher (London).

There was an opening plenary session of general topics, and two concluding plenary sessions in which the Vice-Presidents and Rapporteurs of each section presented reports of the section work, which were then discussed. The section meetings were held simultaneously, and I was therefore able to attend personally only one section at a time.

PLENARY SESSION REPORTS

Section A.—Requirements for Entry into Medical Schools

Dr. V. Johnson (USA) reminded us of Sir Richard Livingstone's scholarly address at the opening session on education, when he described an educated man as 'one who knows and derives pleasure from what is first rate'. A physician must be an educated man and continue his education all his life.

Selection of students is in a confused state, as shown by the multiple opinions expressed on methods and standards. Some

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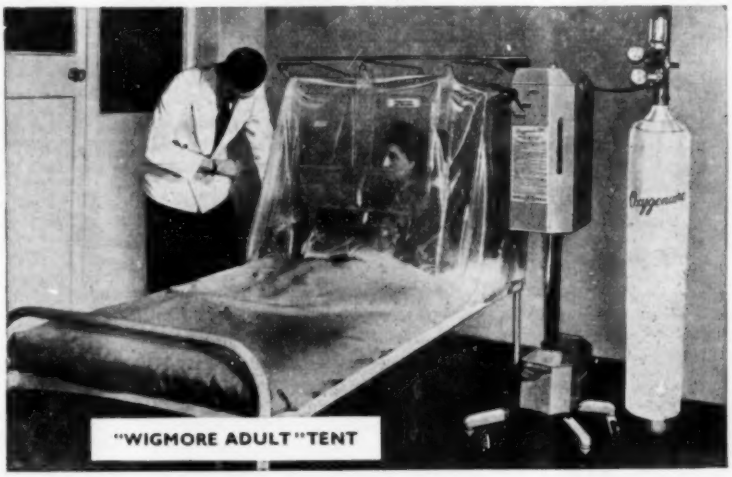

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schools are continuing selection as a research investigation, some as a necessary 'evil', and some because they think they know how; the last are in a small minority.

Intelligence tests are of little predictive value as regards achievement in examinations, but may afford a critical level of test result, below which failure in examinations can be predicted.

Dr. Raymond Whitehead (Manchester) reminded us that under *general education* were discussed the relative values of History, the Sciences and the Humanities, and the decline of interest in the Classics; also discussed were 'popular' versus 'university' standards. The discussions of these papers tended to favour science training as being an essential part of the general education, but in the other matters there was no agreement. It was not agreed that any depth of mathematical training was required.

The *admission requirements* demanded in many countries were described (USA, UK, Portugal, Italy, Israel, Mexico) and there was no unanimity as regards which subjects should be demanded by universities; there was unanimity that universities wished to admit student material that had learned to think. Insistence on physics and chemistry was stronger than on mathematics. Most agreed that science can be of as much 'cultural' value as the humanities and arts.

Selection of students received much attention. There were many papers (USA, Australia, UK, India, Canada, Phillipines, Sweden, Hongkong, etc.), and much discussion. The full reports will have to be studied, but, in short, there is no good system of selection judging by the multiple views expressed. Entrance examination standards, data supplied by applicants and their sponsors, interviews single and group, 'aptitude tests', intelligence tests, tests of personality, were all discussed, without any satisfactory answer.

The same type of discussion and conclusions arose out of the discussions on the same subject at the British Commonwealth Universities Congress at Cambridge, which I attended in July 1953. The method of selection at Witwatersrand in which matriculation examination results and data provided by applicants and sponsors, were used, seemed to be in fairly common use; in the UK interviews were often added, and in the USA, interviews and 'tests' of many types.

Selection of pre-medical subjects was discussed at length. Speakers from the different departments concerned, that is Chemistry, Physics, Biology, tended to claim special importance for their respective departments.

This was one of the few occasions on which such a trend was observed at the conference. The conference reacted against more mathematics, favouring the use of teams in graduate research projects, which teams would include properly trained mathematicians. Chemistry (inorganic, organic, and biochemistry) required coordination rather than increased content or time in the curriculum. No enthusiasm was shown for adding a specific course in social sciences. History of medicine as a specific course had its adherents but they received little support, the majority agreeing that all teachers in all subjects should bring in history relevant to their subject. There was no demand for increased biology.

The most prolonged applause of the conference (except that accorded Sir Richard Livingstone) was accorded to Dr. Whitehead when he expressed his own reactions to the discussions under section A—'Perhaps we expect too much of our medical students—medical students *are* young and *are* immature, but so were we and so will students always be; students are merely ourselves when young'.

THE DISCUSSION

The discussion following the above reports included:

Dr. T. B. Davie (S. Africa): 'We want a generally educated student, but why direct the schools to teach specific 'cultural' subjects, since the study of man, as for example in a medical course, offers scope of the greatest cultural value'. He commented on the differences of opinion expressed regarding the desirability of teaching chemistry and physics as 'medical' subjects or 'pure'. He expressed the hope that, in the light of the discussions, a satisfactory method of student selection would be evolved in the future.

Dr. D. G. Anderson (Dean, Rochester, N.Y.) said that although the interview system for selection fared badly in the debate, the USA persists in using interview after a preliminary weeding out by perusal of examination records, sponsors reports, because they think better students have resulted. It is, however, only part of the selection system, and receives part value.

Sweden, France, India added to the discussion but did no more than confirm that selection problems had not been solved in their respective countries.

MEDICAL CURRICULUM

Section B.—Aims and Content of the Medical Curriculum

Sir A. L. Mudaliar (India) remarked that the conference had shown that continuing attention must be given to curricula, from preclinical to internship stages.

The anatomists who read papers are unanimous that much of the detail of anatomy commonly taught is unnecessary. These speakers, and the discussants, were in agreement that a one-year course is adequate, and that it must be adapted to clinical needs if the student is to understand the purpose of anatomy.

Physiology requires a clinical lean, and students should be shown a few clinical cases. 'Experiments' should include those of the simple human type. Anatomy and physiology must be correlated with each other, but perhaps not so dramatically as at Birmingham under Professor S. Zuckerman. Pathology is not just morbid anatomy—it is dynamic—and the pathologist should get to the wards as the clinician to the pathology department.

In the clinical departments nothing can replace working closely with the patient in the ward and out-patient department. There was much discussion on the ways and means of letting the student see the patients in their homes. The clinical specialities must be in balance with the rest of the curriculum, and in balance with local conditions in different countries. The internship period was agreed to be essential.

Instruction in general practice was emphasized. Many methods were described at the Conference, but there was no unanimity on 'how much' and 'how': (The Alexandra Health Centre University Clinic practice is, in my opinion by and large, as good as any of the schemes described from other centres.)

It was constantly emphasized that a balanced curriculum is far more dependent on the balance of the teachers than upon the scheduled time-table of the curriculum. Teachers must be able to teach.

Dr. A. Morgan-Jones (Manchester) commented that the general aim of the curriculum is to produce an educated man, who can build on to his basic medical-school training in any direction—to become a general practitioner, clinical specialist, laboratory worker, or administrator. The components of the scientific method must permeate all teachers and their teaching. We must avoid adding unnecessarily to the vast amount of detail already present in achieving this aim.

The anatomists agreed that one year of anatomy is enough provided that (*a*) teaching anatomy on the living human subject be extended, (*b*) radiological anatomy be adequately taught and (*c*) anatomy of a more applied type spread over to the pathology and later years. Anthropology and embryology as part of the training of the undergraduate should be 'minimal'.

Physiology also need not extend over a period of more than one year, provided simple human 'experiment' be included, and provided physiology spread over to the clinical years taught by clinicians and–or physiologists.

There was a general feeling that anatomy and physiology should be taught side by side and correlated together. The Birmingham scheme had been stated to result in no worse knowledge of anatomy on the part of students than any other schemes.

Introduction to patients should be early, even if only by case demonstrations in the very earliest stages (that is, during the anatomy and physiology training period). In France (Paris) clinical instruction starts in the first year, but this was criticized by most.

The need for an introductory course to ward work was emphasized, the recommended duration varying from a month to a year, the general feeling favouring 3 months. The course must emphasize the 'holistic' approach to the patient, and include psychology.

CLINICAL EXPERIENCE

All emphasized that there can be no substitute for clinical experience, and that clinical teaching must not be 'strangled' by laboratory technical training.

Teaching requirements in obstetrics were particularly likely to vary according to local conditions in different countries. There are no generally applicable rules to decide the amount of practical experience that is needed in different countries.

It is generally agreed that paediatrics require time in the curriculum second only to medicine, surgery and obstetrics. The conference at this discussion did not take kindly to the quantitative argument that 'time devoted to a subject should be proportionate to its incidence in practice'. Some considered that an examination in paediatrics should be included as part of the final examination, and others thought not.

Regarding 'minor' specialties, there was no unanimity as to whether they should be restricted by setting a limit to the time spent by students in special departments, or by returning these specialties to the folds of general medicine and general surgery.

It was agreed that psychological medicine should pervade the teaching of all clinicians. It was not considered important to increase the number of hours given to the department of psychological medicine in an average present-day curriculum, but the content of the course should be more in the direction of the psychiatry of everyday practice. Integration and cooperation between the psychiatrist, the physician and the paediatrician was emphasized. This cooperation and coordination is best achieved within the precincts of the general hospital, if the student is to be prevented from regarding psychiatry as 'another specialty'.

It was agreed that a year's internship should be compulsory.

The conference emphasized breadth of education, and method rather than detail, using techniques of teaching that make the student think for himself. Didactic lectures have their place, provided they are not dictations from textbooks. A teaching technique that stimulates thought is the 'conference'.

Students must be given free time to work, read, play.

The 'tutorial' system (a tutor caring full-time for a group of 6-8 students) is desirable but costly.

The discussion that followed included:

Dr. Oliver Cope (Surgeon, Harvard) spoke of teaching clinical specialties as part of the parent subjects, but was uncertain whether to include orthopaedics and gynaecology in this category.

Professor Löffler (Switzerland) doubted the value of sending the student to see the patient in his home—is it economic and worth the time spent? He disagrees that didactic lectures should be abolished—'Surely we have all learned from the lectures we have heard at this conference?'

Dr. Weiskotten (USA) agreed on the importance of integral medicine, but emphasized that its teaching required adequate staff and beds.

TECHNIQUES AND METHODS

Section C.—Techniques and Methods of Medical Education

Professor A. Hurtado (Peru) emphasized the points of non-agreement in his section.

Should undergraduate training aim at preparing a foundation on which to build later in any direction—general practice, clinical specialization, laboratory work—or should it aim at producing a general practitioner complete with all techniques? In spite of the fact that we are training the majority of our students for general practice, the majority opinion of the conference favours emphasis on training of the basic type in all subjects of the curriculum rather than on training in details and techniques.

Should a student carry out research? It was agreed that he must be introduced to the scientific method in all subjects, but the conference doubted the value of having all students partake in 'research', which to them was really a 'pseudo-research'. Should teachers be full-time or part-time? All agreed that in the pre-clinical subjects, the majority should be full-time. In the clinical subjects, varying views were expressed. The general consensus favoured mixed teams of part-time and full-time teachers. It was agreed that full-time workers are essential to research.

Didactic lectures have their place, but should be planned to assist the student to understand, and to learn method rather than detail. The conference emphasized group discussions as a method of teaching.

All agreed on the importance of a personal student-teacher relationship. A proportion of the staff must have special teaching-ability, for which they must be appointed to their posts, even if devoid of research experience and bent.

Professor Ian Aird (London) said the question had been put, 'When should the student come into contact with the patient?' All agreed early, but also all agreed that too early personal contact between student and patient led to embarrassment and served little purpose. Demonstrations of cases at an early stage were good.

Out-patient teaching was generally agreed to be good. Teaching in patients' homes did not receive unanimous approval. It was emphasized that the out-patient teacher must be an experienced clinician.

The Western Reserve scheme of 'vertical' education was debated at length. Many were sceptical of its ultimate success in its present form, and felt they would prefer to let the Western Reserve students be the guinea-pigs for the experiment for the next few years.

The scientific method must be inculated in all teaching in all subjects. The clinico-pathological conference and the clinico-physiological conference, properly conducted, are important methods of teaching this. The teaching of scientific methods does not depend on laboratory experiment, and the United Kingdom at least deplored indiscriminate use of animals by students for experimental purposes.

Visual aids in teaching received much discussion. Films are only of value if properly selected and produced, and very few are suitable. Selected still pictures are of indubitable value.

Why do students fail? This paper received wide publicity, and must be read in the original. All agreed that both the students and the teachers must be considered as the possible causes of failure.

The discussion that followed included:

Professor Garreton (Chili) emphasized the indispensability of the University in teaching.

Dr. Cardew (Clinical Photography) reminded the conference of Professor Tom Jones' address, in which he said that all visual media for teaching are but tools of a trade, and each tool has the uses limited by its own character. Over-enthusiasm in the use of visual aids is an abuse. The best cine-films are difficult to obtain and are expensive.

Professor Moore (USA) made 4 points: (*a*) The stimulus to students is from their teachers, not from methods and techniques. (*b*) The CPC is of paramount importance. (*c*) Why do students fail? Teachers must examine themselves when their students fail. It is the teachers' responsibility to salvage failures. (*d*) Audio-visual aids, properly used, are good teaching weapons.

SOCIAL MEDICINE

Section D.—Preventive and Social Medicine

Professor A. Stampar (Yugo-Slavia) gave his own views at some length on the importance of social medicine, and its history. The expression of his own views left him little time to give his summary of his section's discussions. He mentioned that speakers had bewailed the lack of a clear definition of the term social medicine, and had emphasized the need for each country to adapt its teaching of social medicine to its own peculiar social conditions. Many speakers stressed that it is a discipline that must pervade the teaching of all teachers.

Dr. Charles Fletcher (London) opened his report by commenting that it would appear that the giving of a full section of the conference to social medicine meant either that it is a subject important enough to take up one-quarter of the conference's time, or that there is perplexity regarding what it is and how to teach it.

It was generally agreed that all good teachers do and must pay attention to the social problems of their patients, but can and should be assisted by experts in the field—experts with specific training in subjects such as public health, sociology, biostatistics, genetics. The locally-available mechanisms for social therapy must be known to all practitioners. Special departments of social medicine in schools are needed if research is to be conducted.

The method of teaching social medicine to students was debated. Some advised that students be given a family to study, all agreed that instruction outside the hospital ward is needed; group discussions and visits to institutions such as factories and child welfare clinics are other means. There should be simple lectures in statistics, genetics (to advise parents wisely), nutrition (which must be included in the teaching of all subjects), housing, sanitation.

There was general complaint in this Section that social medicine has not received the recognition that its advocates desire. On the other hand, it was pointed out that the subject must be made attractive by reducing the highly indigestible phrases so commonly used. And it was suggested that lecturers in social medicine should lecture with stethoscopes around their necks.

The discussion that followed included:

Dr. James Faulkner (USA) commented that courses of lectures on drains are agreed to be inadequate. Instruction must include practical teaching, as in all subjects. The student interest must be roused, and social medicine must pervade all teachers' teaching. He thought it was probably necessary to have chairs of social medicine.

Professor Spinelli (Italy) put in a plea that the world should pool all its doctors and distribute them as and when they were needed all over the world. To achieve this, we must standardise all curricula and methods of medical education.

Professor T. Francis (Canada) expressed the view that the concept of social medicine is a point of view concerned with the physician-community-patient interrelationship, and must pervade all teaching rather than be taught only by a special department.

There was a certain amount of woolly thinking and discussion in this section, due largely to lack of definition of the term social medicine.

COMMENT

The Conference was outstanding for the broadness of its concepts and discussions. The Social Medicine section was the most difficult to assess, owing to the many differences of opinion regarding the scope and definition of the term 'social medicine'.

There was unanimity that the finest-looking curriculum can be ruined by ineffective teachers, and the most stereotyped and orthodox curriculum made effective by good teachers. The ability of teachers to teach and inspire their students was emphasized.

All agreed that certain disciplines should pervade the whole course and be included in the teaching of all subjects. Examples of such are psychological medicine, social medicine, statistics and the scientific method. The extent of the teaching of these disciplines by the special departments concerned would vary with the discipline. Dogmatism was generally condemned, and it was advised that empiricism should be carefully rationed.

The general aim was to produce in 6 or 7 years an educated man who can continue to build on the foundations provided at medical school, rather than to produce a machine-like type of technically qualified practitioner.

The general inadequacies of medical education were contributed to by inadequacies in the student, in the curriculum, and, last but not least, in the teacher.

EASY-TO-USE CARD INDEX FOR DOCTORS

Dr. K. V. O. Gunn, M.B., Ch.B., D.M.R., radiologist to the Mines Benefit Society, X-ray Department, Johannesburg, writes as follows to the Editor of *The South African Medical Journal*:

The punch-and-clip system of card indexing is well known and can be adapted to cover a wide range of subjects. I am using a card designed to suit my own work, which may be of interest to medical colleagues.

The card measures 5 x 8 inches; in the reduced illustration the black circles are the holes in the card. The other side of the card is ruled for entries under the headings 'date', 'patient' and 'remarks'.

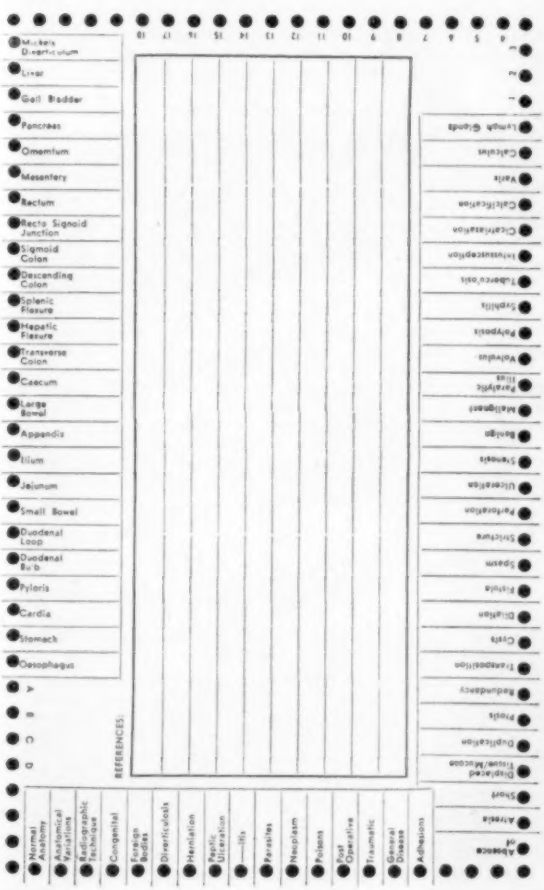
The headings used in this card were obtained from *Standard Nomenclature of Disease and Standard Nomenclature of Operations*, editor Edwin P. Jordan, published by the Amer. Med. Assoc., Chicago. I use it to reflect positive cases diagnosed radiologically and literature references to cover the gastro-intestinal tract.

The capitals A, B, C and D can be used for any grouping: e.g., I use C to indicate the cards upon which literature references are entered. The figures 1-12 reflect months of the year, and 13 onwards represent years from 1953.

The beauty of such a system is of course the elimination of tedious sorting. The cards are automatically sorted by a knitting-needle passed through the relevant holes—a few shakes and the positive cards fall off the needle. They are then gathered and the next subheading is 'holed' and so on. It takes a few seconds to find one card out of a large group.

I have used these cards for some months now and find them very suitable for case checks and follow-up statistics. If I were to design another similar card I should use fewer 'word' headings.

I must record my appreciation to Messrs. Matherson and Ashley & Co., of Johannesburg, and in particular to Mr. Ashdown and Mr. Moon of that firm for their ready assistance in the printing of the cards.



ERRATUM

By error the price of *the Journal of Clinical and Experimental Psychopathology*, which from January 1954 incorporates *the Quarterly Review of Psychiatry and Neurology*, was given in the *Journal* of 23 January as £11·00 a year. The price is $11·00 a year.

IMPRESSIONS OF A YEAR'S WORK IN A U.S.A. HOSPITAL

Dr. W. P. W. Jackson, who with Mrs. Jackson recently spent a year in Boston, U.S.A., and who has now returned to his full-time post in the Department of Medicine at the University of Cape Town and Groote Schuur Hospital sums up below some of his outstanding impressions of his year's work in an American Hospital. These are:

(1) Vast research organisation—many more workers in Boston paid by grants than as clinicians.

(2) Nevertheless, excellent general physicians still extant in the Massachusetts General Hospital.

(3) Unhurried and detailed consideration of all patients in all circumstances.

(4) Exorbitantly high cost of medical care in hospitals even if insured.

(5) Students considering themselves consultants, and being treated as such.

(6) Enormous importance attached to meetings, conferences and discussions (rightly so).

(7) Poor standard of nursing.

(8) Disregard and lack of interest in British and European literature.

(9) Gratefulness for opportunity of spending a year with America's greatest living physician.

Dr. Jackson held an Eli Lilly Research Fellowship and worked under Dr. Fuller Albright at the Massachusetts General Hospital. His work was mainly in the endocrine and metabolic sphere, with particular attention to the problem of osteoporosis, the aetiology of diabetes and the relation of ACTH and cortisone to these and other metabolic states.

He hopes to further these researches here.

He also continued the clinical investigations, classification and collection of examples of osseous dystrophies. In the laboratory he worked on the relation of serum proteins to alkaline phosphatase activity and on the separation and estimation of the ionised faction of the serum calcium. He lectured in Boston at various centres on 'pre-diabetes' and read a paper on that subject at the Endocrine Society's Annual Conference in New York.

Dr. and Mrs. Jackson penetrated with a colour camera into Virginia, and as far as Niagara Falls, into Canada and into the White Mountains.

NAIROBI'S KING GEORGE VI HOSPITAL

ALASTAIR MATHESON

When the final extensions to Nairobi's King George VI Hospital have been completed, a total of £825,000 will have been spent to provide the Africans of Kenya with one of the finest hospitals in the continent.

The hospital is the focal point of Kenya's medical services. Research in its modern laboratories helps evolve new techniques in the fight against tropical diseases and gains new knowledge of the plagues that ravage many parts of East Africa. In its medical school Africans are trained to a level that will make their services of great value to their people. African doctors from Makerere University College can avail themselves of one of the finest fields of practice obtainable anywhere; there are few diseases which are not encountered in a year at the hospital, and the doctors have at their disposal the equipment and resources to fight them.

Medical services for Africans in Kenya are free.

New buildings now taking shape are designed to form, with the hospital itself, a complete medical centre with all auxiliary facilities, such as clinics, rehabilitation centres and staff housing.

The main block of the hospital, rated as one of the six best in the whole of Africa, has five wings, each three storeys high; there is accommodation for 665 patients in 24 medical and surgical wards. Special attention is given to the children's wards.

The construction of a new consultative out-patients clinic is one of the new projects in hand. Infectious diseases cases will be catered for in another new building to house 200 African, 24 Asian and 16 European patients.

Another big project on which work will soon be started is the rehabilitation centre for the orthopaedic department. Besides its work with patients from all over Kenya, this branch receives people from Uganda and Tanganyika, and manufactures artificial limbs and appliances for sufferers from all parts of East Africa.

At present the main hospital alone is served by eight European doctors, three African doctors, 27 European nursing sisters and an African staff of 462. When the final scheme is completed, the staff, to be housed on the site, will be almost doubled.

The expanding medical school not only supplies the hospital with trained staff, but qualified African hospital assistants go into the Reserves to staff the dispensaries and health centres, which are increasing. These assistants can take charge of rural health centres and refer more serious cases to country hospitals, which in turn may send them to the King George VI Hospital for specialist treatment. This year 20 assistants will qualify, and by 1956 it is hoped that the output will rise to 40.

Despite its size, the hospital is probably one of the busiest in the world. For every patient in the tuberculosis ward there are at least three in the Reserves awaiting admission. Gynaecology too, is an important field. African women from all over Kenya are received at the hospital, many of them making long journeys on foot to get there.

NEW PREPARATIONS AND APPLIANCES : NUWE PREPARATE EN TOESTELLE

Piperazine Adipate (*Entacyl*) Entacyl is piperazine adipate issued in tablet form for threadworm infestation.

Pharmacology: The use of a piperazine derivative in the treatment of threadworm infestation in children was first noted by Mouriquand, Roman and Coisnard (J. Med. Lyon, 1951, 232, 189) They employed piperazine hydrate but owing to its instability it was not altogether satisfactory for medicinal use.

Turpin, Cavier and Savaton-Piller (Thérapie, 1952, 7, 108), in an attempt to overcome the disadvantages of piperazine hydrate, suggested the use of piperazine bis-phenylacetate, but the unpleasant taste and odour of this salt rendered it unsuitable for administration particularly to children.

As a result of investigation of the oxyuricidal properties of piperazine compounds carried out in research laboratories of the British Drug Houses Ltd. it was discovered that piperazine adipate not only possesses effective oxyuricidal properties, but is free from the objectionable physical characteristics inseparable from piperazine hydrate and piperazine bis-phenylacetate. Comparative trials in animals have shown piperazine adipate to be appreciably more effective as an anthelmintic than an equivalent weight of piperazine.

Tolerance: 'Entacyl' (piperazine adipate) is non-toxic at therapeutic dose-levels. It is stable and well tolerated.

Dosage (*oral*)*:* Children up to 6 years of age: one tablet per day per year of life.

Children over 6 years of age and adults: 2 tablets 3 times a day. This dosage should be continued for 7 days.

Packings: Entacyl is available as uncoated scored tablets each containing 300 mg. piperazine adipate. Bottles of 25 and 100 tablets.

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DOSAGE: 1 to 2 capsules 3 or 4 times daily. Supplied only in packages of 20 capsules. Literature on request.

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H. Lisser: Calif. & West. Med., 64, 177, 46.

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PREOPERATIVE TREATMENT. SOPENTAL may be used as a basal anaesthetic prior to surgical operation, its sedative effect minimising the amount of general anaesthetic required. In these cases the normal procedure is one tablet the evening before operation, a further tablet two hours before, and, if necessary, a third tablet one hour before operation.

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SOPENTAL is almost completely destroyed by the liver, and is therefore useful in cases of impaired renal function.

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PASSING EVENTS : IN DIE VERBYGAAN

UNION DEPARTMENT OF HEALTH BULLETIN

Report for the 7 days ended Thursday, 21 January 1954:

Plague: Nil.

Smallpox. Transvaal: One (1) Native case at Biesjesvlei in the Lichtenburg district.

Typhus Fever. Natal: One Native case at Mount Edgecombe in the Inanda district. Diagnosis confirmed by laboratory tests. *Cape Province:* One Native case in the Ngqayi location in the Qumbu district. Diagnosis confirmed by laboratory tests.

Epidemic Diseases In Other Countries.

Plague: Nil.

Cholera in Chittagong, Dacca (Pakistan); Calcutta, Madras, Nagapattinam, Tiruchirappalli, Tuticorin (India).

Smallpox in Allahabad, Bombay, Calcutta, Cochin, Delhi, Kanpur, Madras, Nagapattinam, Tellicherry (India); Haiphong, Saigon-Cholon (Viet-Nam).

Typhus Fever: Nil.

DR. G. W. H. SCHEPERS

Dr. Gerrit Willem Hendrik Schepers of Johannesburg, South Africa, has been named Director of the Saranac Laboratory of the Trudeau-Saranac Institute, Trudeau, New York. He is expected to assume his new duties in the late spring.

The Saranac Laboratory was established in 1894, as part of Trudeau Sanatorium, for research in pulmonary tuberculosis. In the past 30 years its activities have been broadened to include research on other chronic pulmonary diseases, particularly those of industrial origin. Under Dr. Schepers' direction it is expected that the work of the Saranac Laboratory conducted by previous directors, Drs. Edward R. Baldwin, Leroy U. Gardner, and Arthur J. Vorwald, will be continued and expanded.

Born in Dewetsdorp, Orange Free State, Dr. Schepers attended the Universities of Witwatersrand, Pretoria, and South Africa. In addition to holding other academic degrees he is a Doctor of Science and Doctor of Medicine.

From 1934 to 1938 Dr. Schepers was a part-time demonstrator at the Medical School, Johannesburg, and full-time lecturer from 1939 to 1944. He was administrative and research medical officer, Johannesburg Municipal Benefit Society in 1941-1942; and Professor of Anatomy and Head of the Department of Physiology, and Foundation Member of the Medical Faculty, of Pretoria University in 1942-1943.

Dr. Schepers was a Member of the Silicosis Medical Bureau, Union Department of Mines, Johannesburg, from 1944 to 1948; and in 1944 a Member of the Miner's Phthisis Bureau. In 1949-1950 he travelled extensively in the United States, Canada, and Europe as a Commonwealth Fellow studying industrial medicine.

In 1952 he was appointed Chairman of the Pulmonary Disability Committee of the Miner's Phthisis Bureau, a position which he now holds. This year Dr. Schepers was awarded the Queen's Coronation Medal.

COURSES IN CHILD MEDICINE

Le Centre International de l'Enfance (International Children's Centre), Chateau de Longchamp, Carrefour de Longchamp, Bois de Boulogne, Paris (16e), is organizing during 1954 the following 5 courses:

1. *On the rehabilitation of the child with motor disability.* This course is intended for doctors, physiotherapeutists, social workers, educationists and psychologists. Six weeks, 11 January to 21 February 1954.

2. *On prenatal factors in the development of the child: prognosis: medical and social application.* This course is intended for paediatricians, public health administrators, etc. One month, 8 March to 5 April, 1954.

3. *Social Paediatrics.* This course will deal with medico-social questions concerning the welfare of infants, normal or abnormal. Three months, 26 April to 18 July, 1954.

4. *On the prevention and treatment of tuberculosis in the child.* This course is intended for paediatricians and public health administrators responsible for anti-tuberculosis measures, including protective inoculation. One month, 11 October to 7 November, 1954.

5. *Course for social workers concerned with children.* It will deal with all branches of child-welfare work. Six weeks, 8 November to 19 December, 1954.

Bursaries are granted to persons wishing to attend the courses by WHO and the International Children's Centre jointly on the recommendation of the Ministry of Health or of Social Welfare of the country concerned. The courses are conducted in the French language.

MEDICAL CHRISTIAN FELLOWSHIP MEETING

Dr. Rupert Clark, former Superintendent of the Borden Memorial Hospital in China, and recently released by the Communists, will address a meeting of the Medical Christian Fellowship in the Physiology Lecture Theatre at the University of Cape Town Medical School on Wednesday, 17 February, at 8 pm. All interested practitioners are invited to attend.

NEXT MEETING OF FEDERAL COUNCIL

For the information of members of Federal Council, the next Meeting of Council will be held at Medical House, 5, Esselen Street, Johannesburg, on 29 and 30 April and 1 May 1954.

Will Honorary Secretaries of Branches and Groups kindly note that all resolutions for inclusion in the agenda for this meeting must be in the hands of the Secretary of Council, P.O. Box 643, Cape Town, not later than 15 March.

BOOK REVIEWS : BOEKRESENSIES

PRACTICAL PRESCRIBING

Practical Prescribing: An Introductory guide for Medical Students. By Alastair G. MacGregor, M.D., B.Sc., M.R.C.P., and Trevor W. G. Kinnear, M.B.E., M.B., Ch.B., M.R.C.P. (Pp. 87. 6s.) Edinburgh: E. & S. Livingstone Limited. 1953.

Contents: 1. Measurement and Dosage of Drugs. 2. Nomenclature of Drugs. 3. Pharmaceutical Agents. 4. How to Write a Prescription. 5 National Health Service Prescribing. 6. Drugs and the Law. 7. Administration of Drugs. Appendices: (*a*) Doses of Drugs. (*b*) International Biological Standards, 1953. (*c*) Drugs Used in Radioscopy. (*d*) Drugs Used Externally. (*e*) Drugs Applied to the Eyes. (*f*) Physical Agents. (*g*) Radio-active Isotopes. (*h*) Names, Symbols and Atomic Weights of Elements. (*i*) Suitable Quantities of Preparations to be Prescribed.

Pharmacology is a branch of medicine that is advancing rapidly over a wide front. Not the least important of the many facets of this subject is the administration of drugs. In recent years there has been much change in the way in which drugs are prescribed and administered. This book clearly and consisely demonstrates by its general account and its examples the ways in which modern drugs should be prescribed and given. It supplies the student with essential material that is not presented in many books on pharmacology. Doctors, nurses and pharmacists will also gain from a study of its contents.

Many people still expect a bottle of medicine from their doctor but generally nowadays it is preferable to give a drug in a dry form as a tablet, which for children can be crushed and sweetened. The B.P. now provides many tablets.

The Pharmacopoeia no longer gives Latin titles for new drugs and, as many teachers have stressed for years, prescriptions should be written in English. Latin is no longer the international language of educated men and its use does not guarantee international uniformity, for the Latin title of a drug may vary from country to country.

The metric system is being increasingly used but complete abandoning of the Imperial system with its 'archaic and old-fashioned inconveniences' has unfortunately been retarded, not the least by those in the medical profession opposed to any radical change.

In a recent Health Services Conference held in England to discuss 'Making the Most of Present Resources' (Brit. Med. J., 7 November 1953) a session was devoted to economy in prescriptions and

treatment. It was shown that much saving could be made by establishing a hospital economy committee, by the use of B.P. drugs rather than non-official products, and by economy in dressings. It was pointed out that students should be taught not only pharmacology but also prescribing, which is not at all the same thing. This book can be recommended as an aid towards the proper use of drugs. N.S.

DIFFERENTIAL DIAGNOSIS

Handbook of Differential Diagnosis. By Harold Thomas Hyman, M.D. (Pp. 716. $6.75). Philadelphia; London; Montreal: J. B. Lippincott Company. 1953.

The practice of medicine is becoming increasingly more difficult and demanding, and it is with this in mind that the author has prepared this Handbook of Differential Diagnosis.

The work will prove a very useful addition to the medical library of every medical practitioner. As the author rightly points out in his *precis*, it is not conducive to consecutive reading, but as a ready reference when the occasion arises it will prove of inestimable value to the clinician. —

This handbook can truly be described as a monumental work of its kind, covering as it does the whole field of science and symptoms of disease, clearly and concisely set out, with the print easy to read. The fact that American spelling is used is a minor difficulty, easily surmounted. C.A.H.G.

CORRESPONDENCE : BRIEWERUBRIEK

GALL-STONE ILEUS

To the Editor: It was with great interest that I read an article by Mr. A. E. Dreosti[1] on gall-stone ileus in the *Journal* of 16 January 1954. I should like to record briefly my own experience, and to relate a sign which I think is very important and very helpful in arriving at an *early* diagnosis.

Many years ago my first patient, a woman in the sixties, died from gall-stone ileus. It was in the days before 'scout' films for an acute abdomen were used in diagnosis; I was misled by the intermittent nature of the obstruction, and only operated when the obstruction had become complete. Thus 48 hours of valuable time was lost. My second case fared better. The third case was admitted to hospital with a diagnosis of a rectal polyp causing intermittent anal (ball valve) obstruction, and occasional passage of small quantities of blood. The finger in the rectum settled the diagnosis, for there and then a gall-stone ¾ inch in diameter was easily removed without resorting to surgery. These three stones were handed over to the late Professor Gray Turner, who was very interested and had written on the subject.

More recently, on 7 February 1950, and for the first time, my attention was drawn to a sign by Dr. Eric Samuel. The patient, a man of 73 years, was suffering from acute intestinal obstruction. A tentative diagnosis of gall-stone ileus was made. Scout X-ray of the abdomen showed the usual features of dilated coils of the small intestine and an occasional fluid level. No gall-stone was to be seen.

However, in the right upper quandrant of the abdomen gas was seen to be present in the intrahepatic and extrahepatic ducts. This clinched the cause of the obstruction, and a stone almost spherical and 1¾ inch in diameter was removed from the ileus with a successful result.

Gall-stone ileus differs from other types of mechanical obstruction in that it is *intermittent*, and this very feature lulls the doctor into a feeling of false security. Valuable time is lost, until the obstruction becomes complete; and during this period the patient becomes more toxic and the prognosis worsens.

Whatever the obstruction, there will be dilated coils and fluid levels, but these are relatively late features. In 50% of cases the obturating stone is revealed, but in nearly all cases of gall-stone ileus gas is seen in the biliary tree. Explanation is obvious.

Attention is drawn to this because it is an early sign, and further time-wasting examinations are superfluous. This sign is particularly emphasized by Petren and Hellmer on the Continent and in the United States by L. Rigler.

One further case, because of its rarity and bearing on this subject, is worth recording. On 18 September 1953, during the course of a cholecystectomy, a fistulous communication was encountered between the body of the gall-bladder and the anterior wall of the stomach. The opening was about 1 inch in diameter, and lying within it and occupying the entire opening was a gall-stone with its greatest mass towards the lumen of the stomach. I have no doubt that sooner or later it would have precipitated itself into the stomach and given rise to another case of gall-stone ileus.

J. E. Ellison

98 Lister Building
Cor. Jeppe and Smal Streets,
Johannesburg
22 January 1954

[1] S. Afr. Med. J., **28**, 41.

HANDLING THE BRONCHOSCOPE

To the Editor: Dr. Lance Knox's excellent letter in the *Journal*[1] of 16 January expressing his resentment against Drs. Adler and Fuller at their claim that the Thoracic surgeons are responsible for the reduction in bronchoscopic mortality has my fullest support.

The sweeping generalization that Ear, Nose and Throat surgeons are incompetent and dangerous bronchoscopists has obliged Dr. Lance Knox to state that his mortality record is nil. I must follow suit. After 25 years of bronchoscopy for every conceivable indication my personal record of mortality is also nil. In this I have been incredibly lucky, particularly in the early days of risky anaesthesia and before the advent of antibiotics and sulfa drugs.

In the large centres of Europe and America the best bronchoscopists are found among the Ear, Nose and Throat surgeons. Cooperation with the Thoracic surgeons is as imperative as it is inevitable. I have at all times welcomed their help.

Some twenty years ago when I held the post of Registrar at the Royal Ear Hospital, University College Hospital, London, Drs. Scott Pinchin and Morlock invited me to assist them with bronchoscopies at the Victoria Hospital for Chests. We did hundreds of bronchoscopies and incidentally devised the first instrument to give a view of the opening of the upper-lobe bronchus. Mr. Guy Drew of Down Bros. made this attachment for me, and it was the first time this had been done in England. At that time my chiefs were displeased with my association outside the Ear, Nose and Throat field.

The pendulum now seems to have swung fully over and the Thoracic surgeons are attacking us.

O. Popper

P.O. Box 373
Johannesburg

Senior Aural Surgeon, Johannesburg Hospital and Transvaal Memorial Hospital for Children

[1] S.Afr. Med. J., **28**, 60.

UTERINE INERTIA

To the Editor: As a general practitioner I wish to answer your correspondent, Dr. H. P. Botha, regarding the treatment of his case of a primapara, where there was no obvious disproportion, but definite uterine inertia.

In this case labour started on Wednesday and only on Saturday evening did he, hesitantly, decide to administer 'pitocin'—no doubt according to text-book treatment. In general practice 'pitocin' must be administered early in the first stage of labour where the uterine contractions are weak and no gross disproportion is present, especially when, after the rest following pethedine, the contractions actually diminish in strength and in rate.

One must not withhold 'pitocin' until signs of maternal exhaustion or foetal distress develop. In the absence of gross disproportion it is the withholding of 'pitocin', not its administration, that is dangerous.

H. J. Sutherland, M.B., Ch.B.

P.O. Box 14
Engcobo, Transkei
20 January 1954

curb inflammation

combat infection

protect the injured eye

CORTOMYD

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AGENCY DEPARTMENT : AGENTSKAP-AFDELING

KAAPSTAD : CAPE TOWN

Posbus 643, Telefoon 2-6177 : P.O. Box 643, Telephone 2-6177

PRAKTYKE TE KOOP : PRACTICES FOR SALE

(1484) Westelike Provinsie. Uitstekende geleentheid om praktyk in hospitaaldorp te bekom. Besonderhede op aanvraag.

(1539) Noord-Kaapland. Goedgevestigde praktyk met kontantinkomste vir die laaste boekjaar van £2,377 17s. 8d. Premie £1,250, insluitende medisynes, instrumente en spreekkamermeubels. Ook spoorwegaanstelling. Woning en spreekkamers teen geringe huurgeld. Terme vir afbetaling kan gereël word.

OPHTHALMIC PRACTICE FOR SALE

(1325) Excellent opportunity to acquire expanding practice with 2 appointments. The area served is enormous and the population is steadily becoming specialist conscious. Present income approximately £3,000 per year. Possibilities for expansion are exceptionally good.

CONSULTING ROOMS AVAILABLE

(1579) In Parliament Street, Cape Town. Available on temporary or permanent bais—mornings only.

LOCUM REQUIRED : PLAASVERVANGER VERLANG

(1583) S.W.A. Locum from 1 May for 4—6 weeks. Salary £2 10s. p.d. plus all free. Small Hospital.

REGISTERED SPECIALIST : PHYSICIAN REQUIRED

(1531) To act as locum for 3 months from approximately end June. Locum to take all fees and pay all professional expenses. The locum could if he wished take on the whole practice, after completion of the engagement or later, for £1,500, payable at £500 a year for 3 years.

* * *

JOHANNESBURG

Medical House, 5 Esselen Street, Telephone 44-9134-5, 44-0817
Mediese Huis, Esselenstraat 5, Telefone 44-9134-5, 44-0817

PRACTICE FOR SALE : PRAKTYK TE KOOP

(Pr/S100) Hospital town in Southern Rhodesia. Established private practice. Takings approximately £500 p.m. Will suit doctor interested in surgery and gynaecology. Premium required is £1,000 (excluding instruments and equipment) and terms could be arranged to suit buyer. Long introduction will be given. BUYER COULD START IMMEDIATELY AS LOCUM.

ASSISTANTS/LOCUMS REQUIRED
ASSISTENTE/PLAASVERVANGERS BENODIG

(L/V424) O.F.S. Locum for three weeks in January or February. Non-European practice, with no night work. Terms and allowances to be discussed.

(L/V477) O.V.S. Plaasvervanger vir Februarie. Salaris £100 p.m. en alles vry.

(L/V486) O.V.S. Plaasvervanger vanaf 26 Mei tot 1 Augustus. £2 10s. per dag, alles vry en 'n kar kan verskaf word. Amper geen nagwerk. Huis beskikbaar vir getroude persoon. Sal ook 'n dame pas.

(L/V487) O.V.S. Plaasvervanger vir Februarie. Kar word verskaf. Salaris £2 12s. 6d. per dag en alles vry.

(L/V489) Reef. Locum for February. Salary £3 10s. per day. No night work.

(L/V445) O.V.S. Plaasvervanger vir April. Salaris £2 12s. 6d. per dag, alles vry en 1s. per myl in distrik, reistoelae.

(L/V499) O.V.S. Plaasvervanger vir April. Salaris en toelaes om gereël te word. Sal dame ook pas.

(L/V505) Reef. Partnership practice. Locum as from 13 January till 24 February. Salary, etc. to be arranged.

(L/V506) Tvl. Plaasvervanger vir Maart. Min nagwerk. Man of dame. 2½ ghienies per dag en alles vry.

(L/V507) O.V.S. 80 myl van Rand. Plaasvervanger vir een maand, enige tyd. Salaris £3 3s. per dag en alles vry.

(L/V508) Tvl. Plaasvervanger vir twee maande. Kan enige tyd begin. Salaris, ens. om gereël te word.

(L/V509) Mine Medical Officer. Salary £100 p.m. plus £15 p.m. C.O.L.A., free house and servant and the use of the company's car, *or* two doctors to form partnership, with scope for private practice, at a retaining fee of £1,000 p.a. each. Hospital and X-Ray facilities.

(L/V510) Assistantship with view to partnership. Well-established general practice in coastal town. Please apply in writing.

REQUIRED

Partnership or locum or assistantship, both with view to partnership, required in Johannesburg, by doctor with own car and a surgery in the Northern suburbs.

* * *

DURBAN

112 Medical Centre, Field Street. Telephone 2-4049

PRAKTYKE TE KOOP : PRACTICES FOR SALE

(PD23) Natal. Prescribing practice particularly suitable for a woman doctor interested in obstetrics and gynaecology. Total gross receipts for 1950, £1,570; 1951, £1,595; 1952 (6 months), £1,340; 1953 (3 months), £382. Premium £1,250, includes furniture, fittings, instruments, drugs and existing book debts.

(PD24) Natal South Coast. Practice suitable for doctor who does not want full-time work. £250 for drugs, dressings, instruments, etc. No charge for goodwill. Small house on ¼ morgen, £1,600. Immediate occupation.

LOCUMS REQUIRED

(72) Durban. Locum required for January and February with view to assistantship. General practice. Salary to be discussed with the Principal.

(73) Near Durban. Locum for January and February. £2 12s. 6d. per day, all found. Must have own car.

(74) Zululand. Locum for February. £2 12s. 6d. per day. all found. Own car necessary.

(75) Durban. 1 January. Locum view to assistantship/partnership. General practice. Salary to be discussed.

Transvaal Provincial Administration

VACANCIES: TRANSVAAL PUBLIC HOSPITALS

Applications are invited from suitably qualified candidates for the undermentioned posts at Public Hospitals in the Transvaal.

Applications should be addressed to the Medical Superintendents of the undermentioned Hospitals concerned and should contain full particulars as to the age, professional and academic and language qualifications, experience and conjugal status of the applicant and should further indicate the earliest date upon which duties can be assumed. Copies, only, of recent testimonials to be attached.

Cost of living allowance payable at present to full-time employees:

COST OF LIVING ALLOWANCE

Salary	*Married*	*Single*
Over £350 per annum	£320 per annum	£100 per annum

Full-time employees receive in addition to their salaries and cost of living allowance, the following privileges:

Leave and rail concession.

Successful candidates will be required to submit satisfactory certificates as also to submit to a medical examination at the hospital concerned.

Application forms are obtainable from any Transvaal Provincial Hospital or the Provincial Secretary, Hospital Services Branch, P.O. Box 2060, Pretoria.

The closing date of applications for undermentioned posts will be 24 February 1954.

Hospital	*Post*	*Emoluments*	*Remarks*
Germiston	Senior Resident Medical Officer	£480 per annum	Registered medical practitioner. Must be quilified for at least 1 year.
Johannesburg Hospital and the University of the Witwatersrand	Medical Registrar (Tutorial)	£620, 780, 820, 860	Registered medical practitioner. Must be qualified for at least 2 years.

(44155)

Provinsiale Administrasie van die Kaap die Goeie Hoop

HOSPITAALDEPARTEMENT

GESAMENTLIKE MEDIESE PERSONEEL: VAKATURE

1. Aansoeke word ingewag om die ondergenoemde vakante pos van Mediese Praktisyn by die Gesamentlike Mediese Personeel van die Groote Schuur-hospitaal.

2. Die diensvoorwaardes is voorgeskryf en is onderworpe aan die Hospitaalraaddiens, Ordonnansie Nr. 19 van 1941, soos gewysig, en die regulasies wat ingevolge daarvan opgestel is.

3. Aansoek moet gedoen word (in duplo) op die voorgeskrewe vorm, Staf 23, wat verkrygbaar is by die Direkteur van Hospitaaldienste, Posbus 2060, Kaapstad, Superintendent van enige Provinsiale Hospitaal of by die Sekretaris van enige Skoolraad in die Kaapprovinsie. Die sluitingsdatum vir die ontvangs van aansoeke is 27 Februarie 1954 en voltooide aansoekvorms moet aan die Mediese Superintendent, Groote Schuur-hospitaal, Observatory, Kaap, gepos word.

4. Die gekose applikante sal diens moet aanvaar op 1 April 1954.

Departement	*Pos*
Ortopedie	1 pos Mediese Praktisyn Graad C.

Salarisskaal: £1,000 × 50—£1,200 per jaar. Behalwe bogenoemde salaris word daar nog 'n duurtetoeslag van £320 per jaar aan getroude en £100 per jaar aan ongetroude amptenare betaal.

Vereiste kwalifikasies

Nie minder as vyf jaar ondervinding na ontvangs van Graad of vier jaar ondervinding na registrasie waarvan nie minder as drie jaar opleiding voltooi is as spesialis in die besondere afdeling waarin die vakante pos val nie.

(Applikante wat nie die bogenoemde kwalifikasies besit nie kan egter aansoek doen en sal in aanmerking geneem word vir die betrekking teen 'n verminderde salarisskaal).

(12093)

INSTITUTE OF BASIC MEDICAL SCIENCES

Royal College of Surgeons of England — British Postgraduate Medical Federation

LECTURES AND DEMONSTRATIONS IN ANATOMY, APPLIED PHYSIOLOGY AND PATHOLOGY OCTOBER 1954—JANUARY 1955

A full-time Course of Lectures and Demonstrations in the above subjects will be held at the Institute from 4th October 1954 — 1st January 1955. Applications for this Course will be strictly Limited.

Fee — £63

Closing date for applications is Friday, 2nd April 1954

LECTURES IN ANATOMY, APPLIED PHYSIOLOGY AND PATHOLOGY, OCTOBER 1954—JANUARY 1955

A course of Lectures only in the above subjects will be held at the Institute from 4th October 1954 — 1st January 1955. The Lectures will be held in the mornings from Monday to Friday each week.

Fee — £36 15s.

Full information of and application forms for these courses may be obtained from Mr. W. F. DAVIS, Secretary, Institute of Basic Medical Sciences, Royal College of Surgeons of England, Lincoln's Inn Fields, London, W.C. 2. (Holborn 3474).

Provincial Administration of the Cape of Good Hope

HOSPITALS DEPARTMENT

JOINT MEDICAL STAFF: VACANCY

1. Applications are invited for the undermentioned vacant post of Medical Practitioner on the Joint Medical Staff of the Groote Schuur Hospital.

2. The conditions of service are prescribed in terms of the Hospital Ordinance No. 19 of 1941, as amended, and the regulations framed thereunder.

3. Applications should be submitted (in duplicate) on the prescribed form, Staff 23, which is obtainable from the Director of Hospital Services, P.O. Box 2060, Cape Town, or from the Medical Superintendent of any Provincial Hospital or Secretary of any School Board. The closing date for the receipt of applications is 27 February 1954 and applications should be addressed to the Medical Superintendent, Groote Schuur Hospital, Observatory, Cape.

4. The successful applicant will be required to assume duty on 1 April 1954.

Department	*Post*
Orthopaedics	1 post Medical Practitioner Grade C.

Salary scale: £1,000 × 50—£1,200 per annum plus a cost of living allowance payable at present at the rate of £320 per annum for married officials and £100 per annum for single officials.

Qualifications required

Not less than five years experience after graduation or four years experience after registration, of which not less than three years shall have been spent in training as a specialist in the division in which the vacancy occurs.

(Applicants not having the above qualifications may however apply and will be considered for the position at a lower graded salary).

(12093)

O.F.S. Provincial Administration

VOORTREKKER HOSPITAL KROONSTAD

VACANCY: SPECIALIST ANAESTHETIST

Applications are invited from registered specialist anaesthetists for the above post, in a part-time capacity, with right of private practice.

Duties consist of 4 sessions of 4 hours each, per week, at remuneration of £205 p.a. per session.

Applications on prescribed form No. Z83, obtainable from the Secretary, or any Magistrate's Office together with certified copies of Certificates, testimonials, Birth certificate, and Health Certificate, will be received by the undersigned.

F. A. VAN COLLER
Medical Superintendent

Kroonstad
21 January 1954

O.V.S. Provinsiale Administrasie

VOORTREKKER-HOSPITAAL KROONSTAD

VAKATURE: SPESIALIS ANAESTETIKUS

Aansoeke word gevra van geregistreerde spesialis Anaestetikusse vir bogenoemde pos, in 'n deeltydse hoedanigheid met die reg van private praktyk. Dienste bestaan uit 4 sessies van 4 uur elk per week, teen besoldiging van £205 per jaar per sessie.

Aansoeke op die voorgeskrewe vorm Z83, verkrygbaar van die Sekretaris of enige Magistraatskantoor, tesame met Gesondheids- en Geboortesertifikate, sowel as gesertifiseerde afskrifte van sertifikate en getuigskrifte, sal deur ondergetekende ontvang word.

F. A. VAN COLLER
Geneesheer Direkteur

Kroonstad
21 Januarie 1954

Provinsiale Administrasie van die Kaap die Goeie Hoop

UNIVERSITEIT VAN KAAPSTAD: GESAMENTLIKE MEDIESE PERSONEEL VIR GROOTE SCHUUR EN ANDER OPLEIDINGSHOSPITALE

VAKATURE

1. Aansoeke word ingewag van geregistreerde Geneeshere (geregistreerde Spesialiste) vir aanstelling tot die volgende vakante pos:

1 pos van Geneesheer, Graad F, Departement van Algemene Chirurgie, met salaris teen £1,800 per jaar (vasgestel).

2. Die diensvoorwaardes word voorgeskryf ingevolge die Ordonnansie op Hospitaalraadsdiens no. 19 van 1941, soos gewysig, en die regulasies wat daarkragtens opgestel is.

3. Benewens die salarisskaal soos aangedui is 'n lewenskostetoelae betaalbaar aan voltydse beamptes en werknemers teen bedrae wat van tyd tot tyd deur die Administrateur vasgestel word.

4. Van die Gesamentlike Mediese Personeel word vereis om die Provinsiale Administrasie van die Kaap die Goeie Hoop en die Universiteit van Kaapstad gesamentlik te dien.

5. Kandidate moet nie minder as drie jaar ondervinding na registrasie as 'n spesialis in die spesialiteit waarin die vakature bestaan, opgedoen het.

6. Die geslaagde kandidaat, indien nie reeds in die Hospitaalraadsdiens nie, moet bevredigende geboorte- en gesondheidsertifikate indien.

7. Aansoek moet gedoen word op die voorgeskrewe vorm (Staf 23), wat verkrygbaar is by die Direkteur van Hospitaaldienste, Posbus 2060, Kaapstad, of by die Mediese Superintendent van enige provinsiale hospitaal of Sekretaris van enige Skoolraad in die Kaapprovinsie.

8. Aansoeke moet aan die Direkteur van Hospitaaldienste, Posbus 2060, Kaapstad, gerig word, en moet hom nie later as 17 Februarie 1954 bereik nie.

9. Kandidate moet die vroegste datum meld waarop hulle diens kan aanvaar.

(A541916)

Munisipaliteit Bronkhorstspruit

VAKATURE:
DEELTYDSE MEDIESE GESONDHEIDSBEAMPTE

Aansoeke word ingewag van geregistreerde Mediese Praktisyns vir die pos van Deeltydse Mediese Gesondheidsbeampte van die Dorpsraad van Bronkhorstspruit.

Die salaris aan die pos verbonde sal £12 12s. per jaar wees.

Applikante moet meld: Kwalifikasies, ouderdom, huwelikstaat, ens.

Applikasies gemerk „Deeltydse Mediese Gesondheidsbeampte" moet die ondergetekende bereik nie later nie as 4 nm. op Dinsdag 16 Februarie 1954.

C. D. Kleynhans
Stadsklerk

Munisipale Kantore
Bronkhorstspruit
22 Januarie 1954

Municipality of Randfontein

NOTICE NO. 3 OF 1954

VACANCY: PART-TIME MEDICAL OFFICER OF HEALTH

Applications are hereby invited from qualified medical practitioners for the position of part-time Medical Officer of Health.

Detailed particulars of the conditions and requirements attached to the post can be obtained from the undersigned.

Applications should be submitted on the Council's prescribed form which can be obtained from the undersigned and should reach the Town Clerk, Municipal Offices, Randfontein, not later than 12 NOON on WEDNESDAY, 10 FEBRUARY 1954.

Canvassing for appointment in the gift of the Council is strictly prohibited and any proof thereof will disqualify an applicant.

C. J. JOUBERT
Acting Town Clerk

Municipal Offices
Randfontein
14 January 1954

Provincial Administration of the Cape of Good Hope

UNIVERSITY OF CAPE TOWN: JOINT MEDICAL STAFF FOR GROOTE SCHUUR AND OTHER TEACHING HOSPITALS

VACANCY

1. Applications are invited from registered Medical Practitioners (registered Specialists) for appointment to the following vacant post:

1 post of Medical Practitioner, Grade F, Department of General Surgery, with salary at the rate of £1,800 per annum (fixed).

2. Conditions of service are prescribed in terms of Hospital Board Service Ordinance No. 19 of 1941, as amended, and the regulations framed thereunder.

3. In addition to the scale of salary indicated, a cost-of-living allowance at rates prescribed from time to time by the Administrator is payable to whole-time officials and employees.

4. The Joint Medical Staff is required to serve jointly the Provincial Administration of the Cape of Good Hope and the University of Cape Town.

5. Candidates are required to have not less than three years' experience, after registration as a specialist, in the specialty in which the vacancy exists.

6. The successful candidate, if not already in the Hospital Board Service, will be required to submit satisfactory birth and health certificates.

7. Application must be made on the prescribed form (Staff 23), which is obtainable from the Director of Hospital Services, P.O. Box 2060, Cape Town, or from the Medical Superintendent of any Provincial Hospital or Secretary of any School Board in the Cape Province.

8. Applications must be addressed to the Director of Hospital Services, P.O. Box 2060, Cape Town, and must reach him not later than 17th February, 1954.

9. Candidates must state the earliest date on which they can assume duty.

(A541916)

LOCUM REQUIRED

Doctor required as Locum for Pathologist in Cape Town, for July, August and September. Apply 'A.U.C.', P.O. Box 643, Cape Town.

ASSISTENTSKAP VERLANG

Assistentskap met vennootskap in vooruitsig êrens in O.V.S. of Noord-Kaapland word verlang deur ervare Arts (wewenaar) met eie praktyk naby Kaapstad. Skryf aan 'A.U.D.', Posbus 643 Kaapstad.

Munisipaliteit, Randfontein

KENNISGEWING NR. 3 VAN 1954
VAKATURE: DEELTYDSE MEDIESE GESONDHEIDSBEAMPTE

Aansoeke word hiermee ingewag van gekwalifiseerde mediese praktisyns om die betrekking van deeltydse mediese Gesondheidsbeampte.

Volledige besonderhede van die diensvoorwaardes en vereistes aan die pos verbonde, is van die ondergetekende verkrygbaar.

Aansoeke moet op die Raad se amptelike aansoekvorm wat van die ondergetekende verkry kan word, ingedien word en moet die Stadsklerk, Munisipale Kantore, Randfontein, uiterlik om 12 UUR MIDDAG op WOENSDAG 10 FEBRUARIE 1954, bereik.

Gunswerwing om aanstelling in die diens van die Raad is streng verbode en enige bewys daarvan sal 'n applikant diskwalifiseer.

C. J. JOUBERT
Waarnemende Stadsklerk

Munisipale Kantore
Randfontein
14 Januarie 1954

(2000)

IMPORTANT NOTICE

Medical practitioners who intend applying for any appointment specified in this notice for which an advertisement appears in this issue of the Journal are advised to communicate first with the Honorary Secretary of the Branch of the Medical Association of South Africa concerned:

Appointment: Mines Benefit Society, Additional Part-time Ophthalmic Surgeon.

***Branch Address:* 5, Esselen Street, Hospital Hill, Johannesburg.**

South African Railways and Harbours Sick Fund

APPOINTMENT OF RAILWAY MEDICAL OFFICER: ALIWAL NORTH

Applications are invited from registered medical practitioners for appointment to the position of Railway Medical Officer, Aliwal North and line section Sonskyn (excl) to Kraaibrug (incl), at a salary of £292 p.a., plus the fees and allowances prescribed by the Regulations of the Sick Fund, and with the right of private practice.

The salary will be subject to adjustment in accordance with the census of members to be taken on 1 April of each year.

The appointment will be made in terms of the Regulations of the Sick Fund, and will be subject to termination on four months' notice being given by either side.

The successful candidate will be required to reside at Aliwal North, to take up the appointment on a date to be arranged, and to carry out his duties in accordance with the Regulations of the Fund.

Applications should reach the District Secretary, District Sick Fund Board, 19 Terminus Street, East London, not later than 2 March 1954, and should state:

1. Full name.
2. Qualifications (where and when obtained).
3. Experience (where and when obtained).
4. Date of birth.
5. Country of birth.
6. Whether married or single.
7. Whether fully bilingual.
8. Whether South African Citizen.
9. What Government appointment, if any, is held.

Canvassing by or on behalf of any applicant is liable to disqualify such applicant.

Any further particulars required may be obtained from the District Secretary at the above address, on application.

P. J. KLEM
General Secretary

Johannesburg
6 February 1954

LOCUM/VENNOOT DRINGEND BENODIG

Moet een maand locum doen en wedersyds word dan besluit op vennootskap. Geen intreefooi nodig. Inkomste per vennoot twee tot driehonderd per maand netto. Skryf onmiddellik aan: Die geneesheer, Koegasbrug, via Prieska.

REQUIRED

Specialist Anaesthetist assistant with view to partnership in large anaesthetic practice in city. Splendid prospects. Reply 'A.U.B.', P.O. Box 643, Cape Town.

South African Railways and Harbours Sick Fund

APPOINTMENT OF SALARIED SPECIALISTS: DURBAN AND PIETERMARITZBURG

Applications are invited from registered specialists for appointment to the following positions at the salaries indicated, plus the fees and allowances prescribed in the regulations of the Sick Fund and with the right of private practice:

Centre	*Specialist*	*Salary*
Durban	Neuro-Psychiatrist	£1318 per annum
Pietermaritzburg	Pediatrician	£495 per annum

The salaries will be subject to adjustment in accordance with the census of members to be taken on 1 April of each year.

The appointments will be made in terms of the regulations of the Fund, and will be subject to termination on four months' notice being given by either side.

The successful applicants will be required to reside in the centres concerned, to take up the appointment on a date to be arranged, and to carry out their duties in accordance with the regulations of the Fund.

Applications should reach the District Secretary, Natal District Sick Fund Board, Belgrave Mansions, Smith Street Durban, not later than 22 February 1954, and should state:

1. Full name.
2. Qualifications (when and where obtained).
3. Experience (when and where obtained).
4. Date of birth.
5. Country of birth.
6. Whether married or single.
7. Whether fully bilingual.
8. Whether South African citizen.
9. What Government appointment, if any, is held.

Canvassing by or on behalf of any applicant is liable to disqualify such applicant.

Any further particulars may be obtained from the District Secretary at the above address, on application.

P. J. Klem
General Secretary

Johannesburg
9 January 1954

(These appointments have the approval of the Medical Association of South Africa—*Associate Secretary, M.A.S.A.*).

REQUIRED

Experienced general practitioner required as assistant with view to partnership in Cape Peninsula. Reply in confidence, stating experience and salary required. Write to 'A.U.I.', P.O. Box 643, Cape Town.

MINES BENEFIT SOCIETY

Applications are invited for the post of additional part-time Opthalmic Surgeon. For full particulars of the appointment please apply immediately to the General Secretary, Mines Benefit Society, P.O. Box 8603, Johannesburg.

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Provincial Administration of the Cape of Good Hope

HOSPITALS DEPARTMENT

HOSPITAL BOARD SERVICE: VACANCY

1. Applications are invited for the following vacant post:

Institution	*Post*	*Emoluments*	*Closing Date*	*Applications must be addressed to:*
Somerset Hospital Green Point	Medical Practitioner Grade A	£500-600-660-720 p.a.	19.2.54	The Medical Superintendent, Somerset Hospital Green Point

2. Conditions of service are prescribed in terms of Hospital Board Service Ordinance No. 19 of 1941, as amended, and the regulations framed thereunder.
3. In addition to the scale of salary indicated a cost of living allowance at rates prescribed from time to time by the Administrator is payable to whole-time officials and employees.
4. The successful candidate, if not already in the Hospital Board Service, will be required to submit satisfactory birth and health certificates.
5. Application must be made on the prescribed form (Staff 23) which is obtainable from the Director of Hospital Services, P.O. Box 2060, Cape Town, or from the Medical Superintendent of any Provincial Hospital, or from the Secretary of any School Board in the Cape Province.
6. Candidates must state the earliest date on which they can assume duty.

(A541914)

Provincial Administration of the Cape of Good Hope

HOSPITALS DEPARTMENT

SHARLEY CRIBB NURSING COLLEGE, PORT ELIZABETH: LECTURES TO STUDENT NURSES

1. Applications are invited from registered medical practitioners to lecture to student nurses at the Sharley Cribb Nursing College, Port Elizabeth, in the following subject:
Urology: English and Afrikaans medium, 6 lectures per course; 3 courses per annum.
2. Lectures to be given between the hours 8.45 a.m. to 12.45 p.m. Each lecture to be of one hour's duration.
3. Lecturer will be remunerated at the rate of £1 1s. per lecture, and 1s. per examination paper corrected.
4. Further particulars are obtainable from the Principal, Sharley Cribb Nursing College, Port Elizabeth.
5. Applications must be made on the prescribed form (Staff 23), which is obtainable from the Director of Hospital Services, P.O. Box 2060, Cape Town, or from the Medical Superintendent of any Provincial Hospital, or Secretary of any School Board in the Cape Province.
6. Applications must be addressed to the Director of Hospital Services, P.O. Box 2060, Cape Town, and must reach him not later than 10 February 1954.

(A541915)

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Provinsiale Administrasie van die Kaap die Goeie Hoop

HOSPITAALDEPARTEMENT

HOSPITAALRAADSDIENS: VAKATURE

1. Aansoeke word ingewag om die volgende vakante pos:

Inrigting	*Pos*	*Emolumente*	*Sluitingsdatum*	*Aansoeke moet gerig word aan:*
Somerset-hospitaal Groenpunt	Geneesheer, Graad A	£500-600-660-720 p.j.	19.2.54	Die Mediese Superintendent, Somerset-hospitaal, Groenpunt.

2. Die diensvoorwaardes word voorgeskryf ingevolge die Ordonnansie op Hospitaalraadsdiens no. 19 van 1941, soos gewysig, en die regulasies wat daarkragtens opgestel is.
3. Benewens die salarisskaal soos aangedui is 'n lewenskostetoelae betaalbaar aan voltydse beamptes en werknemers teen bedrae wat van tyd tot tyd deur die Administrateur vasgestel word.
4. Die geslaagde kandidaat, indien nie reeds in die Hospitaalraadsdiens nie, moet bevredigende geboorte- en gesondheidsertifikate indien.
5. Aansoek moet gedoen word op die voorgeskrewe vorm (Staf 23), wat verkrygbaar is by die Direkteur van Hospitaaldienste, Posbus 2060, Kaapstad, of by die Mediese Superintendent van enige provinsiale hospitaal of by die Sekretaris van enige Skoolraad in die Kaapprovinsie.
6. Kandidate moet die vroegste datum meld waarop hulle diens kan aanvaar.

(A541914)

Provinsiale Administrasie van die Kaap die Goeie Hoop

HOSPITAALDEPARTEMENT

SHARLEY CRIBB:VERPLEGINGSKOLLEGE, PORT ELIZABETH: LESINGS VIR LEERLINGVERPLEEGSTERS

1. Aansoeke word ingewag van geregistreerde geneeshere om lesings aan leerlingverpleegsters aan die Sharley Cribb-verplegingskollege, Port Elizabeth, te gee in die volgende vak:
Urologie: Engels- en Afrikaansmedium, 6 lesings per kursus, 3 kursusse per jaar.
2. Lesings moet gegee word tussen die ure 8.45 vm. tot 12.45 nm. Elke lesing moet een uur duur.
3. Lektor sal besoldig word teen £1 1s. per lesing en 1s. vir elke vraestel wat nagesien word.
4. Nadere besonderhede is verkrygbaar by die Prinsipale, Sharley Cribb-Verplegingskollege, Port Elizabeth.
5. Aansoeke moet gedoen word op die voorgeskrewe vorm (Staf 23), wat verkrygbaar is by die Direkteur van Hospitaaldienste, Posbus 2060, Kaapstad, of by die Mediese Superintendent van enige provinsiale hospitaal of by die Sekretaris van enige Skoolraad in die Kaapprovinsie.
6. Aansoeke moet aan die Direkteur van Hospitaaldienste Posbus 2060, Kaapstad, gerig word, en moet hom nie later as 10 Februarie 1954 bereik nie.

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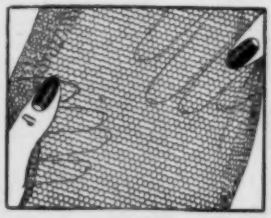

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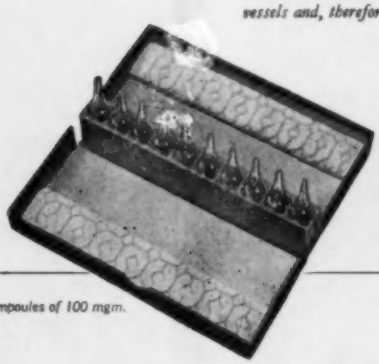

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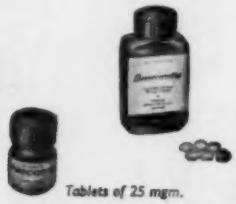

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